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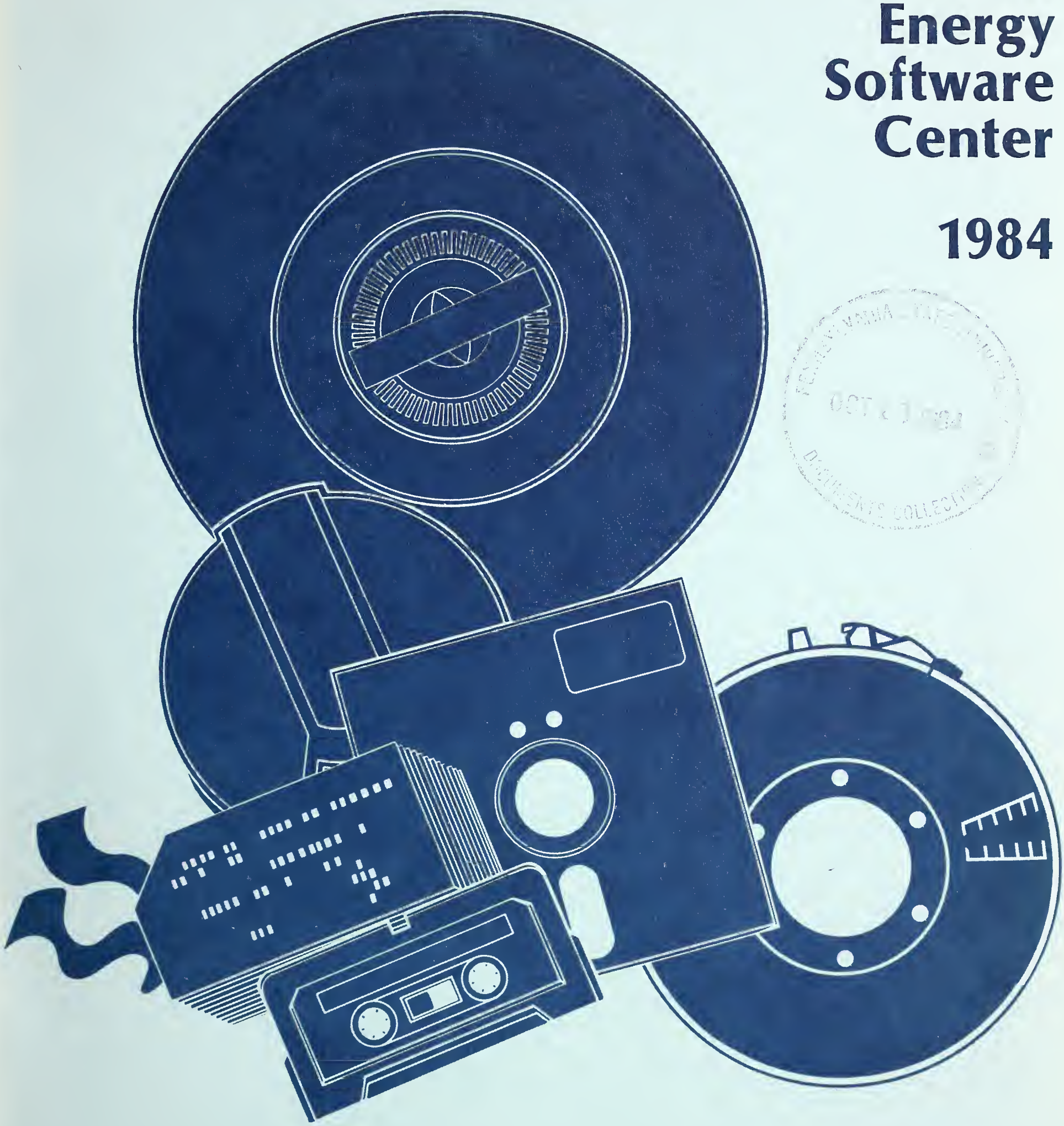

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NATIONAL TECHNICAL INFORMATION SERVICE

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COMPUTER SOFTWARE

FOG; One-Dimensional Few-Group Diffusion Slab Cylinder Sphere.
R. L. Brunnenmeyer, and R. A. Mickle.
Bechtel Corp., San Francisco, CA. 1984, mag tape ANL/NESC-28 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048028 Price code: CP T11

The FOG program solves the one-dimensional few-group diffusion equations in any of three geometries slab, cylinder, or sphere. Provisions are made for calculating the flux, the adjoint flux, and various criticality searches as well as a buckling iteration and automatic Tschebyscheff polynomial computation of source extrapolation factors. Input data must be macroscopic. Scattering is limited to the next lower group. 1 to 4 energy groups are permitted. (ERA citation 08:022420)...Software Description: GE625; FORTRAN IV.

AIM6; One-Dimensional Multi-Group Diffusion in Slabs, Cylinders, and Spheres.
S. Nakamura, and W. Bennedict.
Ohio State Univ., Columbus. Dept. of Nuclear Engineering. 1984, mag tape ANL/NESC-29 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048029 Price code: CP T11

AIM6 solves the one-dimensional multigroup diffusion equations utilizing a microscopic cross section library. Any of three geometries are available slab, cylinder, or sphere. Criticality searches are provided including a concentration search on one or two elements. Homogeneous and inhomogeneous problems may be solved with a variety of boundary condition options. (ERA citation 08:022421)...Software Description: IBM370; FORTRAN IV; OS/370; 300K bytes and 1 scratch unit.

PERT; One-Dimensional Perturbation for AIM and FOG Codes.
G. Gowins.
Boeing Co., Huntsville, AL. Boeing Huntsville Simulation Center. 1984, mag tape ANL/NESC-30 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048030 Price code: CP T03

PERT is a perturbation program designed for use with the AIM6 and FOG programs. Punched card output from these codes is used as input to PERT. Using cross-section data, fluxes, and adjoint fluxes, the relative change in keff can be calculated. Cross sections may be weighted with the adjoint flux and/or direct flux. The neutron lifetime for the delay groups may also be determined. (ERA citation 08:022422)...Software Description: IBM360; FORTRAN IV.

EQUIPOISE3; Two-Dimensional, Two-Group Diffusion in Slabs or Cylinders.
C. L. Wang.
Institute of Nuclear Energy Research, Lung-Tan (Taiwan). 1984, mag tape ANL/NESC-39 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048039 Price code: CP T11

EQUIPOISE3 solves the two-group, two-dimensional, neutron diffusion equations in cylindrical or slab geometry. (ERA citation 08:022423)...Software Description: CDC CYBER73,175;CDC7600; FORTRAN IV; NOS/BE 1.2, 1.3 (CDC CYBER73), SCOPE 2.1 (CDC7600); 125,000 (octal) words of memory are required for execution.

CURFIT; Curve Fitting Experimental Data Points.
J. A. Warrington.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-43R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording

modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048043 Price code: CP T11

CURFIT is a composite program for fitting experimental data points with different types of common analytic curves. There are at present five fits available: (1) polynomial y = summation over i of a(i)*(x**(i)) (2) exponential y = a*exp(bx) (3) cosine y = a*cos(b(x+ c)) (4) series of cubics y = a(j)+ b(j)*x+ c(j)*(x**2)+ d(j)*(x**3) (5) Fourier series. (ERA citation 08:020491)...Software Description: CDC6600; FORTRAN IV and ASCENT; SCOPE 2.0.

CLOUD; Gamma-Ray Dose Rate from a Cloud.
R. E. Cooper.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-47 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048047 Price code: CP T09

The CLOUD program calculates the external gamma-ray dose rate and total integrated dose resulting from the continuous release of radioactive materials to the atmosphere. (ERA citation 08:021795)...Software Description: IBM360; FORTRAN IV; 32K memory.

TEMPEST2; Thermal Neutron Spectrum Cross Sections.
G. Gowins.
Boeing Co., Huntsville, AL. Boeing Huntsville Simulation Center. 1984, mag tape ANL/NESC-50 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048050 Price code: CP T11

TEMPEST2 is a neutron thermalization program based upon the Wigner-Wilkins approximation for light moderators and the Wilkins approximation for heavy moderators. A Maxwellian distribution may also be used. The model used may be selected as a function of energy. The second-order differential equations are integrated directly rather than transformed to the Riccati equation. The program provides microscopic and macroscopic cross-section averages over the thermal neutron spectrum. (ERA citation 08:022424)...Software Description: IBM360; FORTRAN IV; OS/360.

FORM; Fast Neutron Spectrum Cross Section Calculations.
S. Nakamura, and P. Kazemersky.
Ohio State Univ., Columbus. Dept. of Nuclear Engineering. 1984, mag tape ANL/NESC-51 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048051 Price code: CP T13

The FORM, or FORTRAN-MUFT, program is a Fourier transform slowing-down code. A library tape containing 54-group microscopic cross sections, resonance parameters, inelastic scattering matrices, and source spectra is used to generate a 54-group flux spectrum and few-group constants. (ERA citation 08:022425)...Software Description: IBM370; FORTRAN IV; OS/370; 200K bytes storage.

SIZZLE; One-Dimensional Multigroup Diffusion Depletion.
R. A. Blaine.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-58 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048058 Price code: CP T13

SIZZLE solves the one-dimensional, multigroup burnup problem in the diffusion theory approximation for fast intermediate reactors. After the initial calculation at t= 0, average cross sections are computed for further calculations using one to six energy groups. Criticality may be maintained by use of a concentration search. The concentration of the various isotopes is permitted to vary only from region-to-region. Chains included are Th232, U238, and a fission product poison chain. (ERA citation 08:022426)...Software Description: IBM360; FORTRAN IV; OS/360.

SOR3; Stress Analysis of Shells of Revolution.
J. R. Fitch, and R. L. Fagan.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-80R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048080 Price code: CP T11

SOR3 is used for the analysis of symmetrically loaded shells of revolution. The program computes stresses, strains, forces and deflections produced by thermal and mechanical loads. Normal and transverse shear stresses and wall thickness changes are taken into account. The program is based on constitutive equations which retain terms through the second order in the ratio of the thickness to the local radii of curvature. These features make the program applicable to shell structures with moderately large thickness to radius ratios. Maxima of 30 shells into which the structure is divided 30 input points for the shell 10 points at which detailed stress printout is to be provided for brittle fracture purposes. (ERA citation 08:021306)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.0.

FEVER; One-Dimensional, Few-Group Diffusion Depletion Program.
C. L. Wang.
Institute of Nuclear Energy Research, Lung-Tan (Taiwan). 1984, mag tape ANL/NESC-117 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048117 Price code: CP T11

FEVER was developed to evaluate the effects of fuel depletion and control rod withdrawal upon the power distribution of the HTGR. The program performs one-dimensional, few-group depletion calculations. Options are available to adjust control poisons in various regions of the reactor, according to a specified sequence, to represent self-shielding of lumped poisons, and to calculate maximum k-effective at operating temperature and k-effective at shutdown temperature and cold shutdown k-effective at shutdown temperature for each time-step. The xenon-override problem can also be investigated. Maxima of 150 mesh points, 20 spatial regions, 25 isotopes or aggregates in each region 4 groups. It is assumed that the shape of the flux spectrum and the relative amplitude of the

flux between zones does not change over the burnup time-step. (ERA citation 08:020390)...Software Description: CDC CYBER73,175:CDC7600; FORTRAN IV; NOS/BE 1.2, 1.3 (CDC CYBER73), SCOPE 2.1 (CDC7600); 76,000 (octal) words of memory are required for execution.

FAIMOS; One-Dimensional, Multigroup Diffusion in Slab, Cylindrical, or Spherical Geometries.
R. G. Cockrell.
Boeing Co., Huntsville, AL. Boeing Huntsville Simulation Center. 1984, mag tape ANL/NESC-120 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048120 Price code: CP T11

FAIMOS is a multigroup theory, one-dimensional neutron diffusion equation program based on AIM6 (NESC Abstract 29). The principal features are - (a) three geometries (planar, cylindrical, or spherical), (b) calculation of fluxes and multiplication factor, (c) one-iteration problems, (d) choice of one of five sets of boundary conditions at both the inner and outer boundaries, (e) criticality searches on transverse buckling, homogeneous poison, critical radius, location of a poison region boundary, location of a fuel region boundary, (f) adjoint flux calculation, and (g) extensive data edit. (ERA citation 08:022427)...Software Description: IBM360; FORTRAN IV (H); OS/360.

AIREK3; Space-Independent Kinetics with Feedback.
O. G. P. Grosskopf.
South African Atomic Energy Board, Pretoria. 1984, mag tape ANL/NESC-121 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048121 Price code: CP T03

AIREK3 finds the numerical solution to the space-independent reactor kinetics equations based on the method developed by E. R. Cohen. Input and output are simplified and the power, inverse period, feedbacks, and precursors are displayed graphically. (ERA citation 08:020492)...Software Description: IBM360; FORTRAN IV; OS/360.

HERESY3; Two-Dimensional Heterogeneous Reactor Calculation.
D. R. Finch.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-136 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048136 Price code: CP T12

HERESY3 solves the two-dimensional, few-group, static reactor eigenvalue problem using the heterogeneous (source-sink or Feinburg-Galanin) formalism. The solution yields the reactor k-effective and absorption reaction rates for each rod normalized to the most absorptive rod in the thermal level. Epithermal fissions are allowed at each resonance level, and lattice-averaged values of thermal utilization, resonance escape probability, thermal and resonance eta values, and the fast fission factor are calculated. Kernels in the calculation are based on age-diffusion theory. Both finite reactor lattices and infinitely repeating reactor supercells may be calculated. Rod parameters may be calculated by several internal options, and a direct interface is provided to a HAMMER system (NESC Abstract 277) lattice library tape to obtain cell parameters. Criticality searches are provided on thermal utilization, thermal eta, and axial leakage buckling. Maxima of 50 flux/geometry symmetry positions, 20 physically different assemblies, 9 resonance levels, 5000 rod coordinate positions. (ERA citation 08:020493)...Software Description: IBM360; FORTRAN IV and BAL; OS/360; 45K single-precision words of high speed core plus 50K single-precision words of disk (or drum) storage.

NPRFCCP; Fuel Cycle Costs Performance Data.
F. D. Tyson, and R. L. Price.
United Engineers and Constructors, Philadelphia, PA. Technical Computer Services. 1984, mag tape ANL/NESC-146 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048146 Price code: CP T09

Nuclear fuel cycle costs in dollars per year ($/yr), and in mills per kilowatt-hour (mills/kwhr) are computed and tabulated for each region of a multiregion reactor core, on the basis of AEC-leased nuclear fuel material and of privately-owned nuclear fuel material. Fuel cycle costs are computed separately for each region or zone, for core designs of any configuration or combination of material depletion or enriched uranium fuel or other special nuclear material. Printed output of the program includes (a) detailed fuel cycle costs for each zone in tabular form, for AEC-leased and privately-owned nuclear fuel material, respectively, (b) a summary tabulation of nuclear fuel costs for all regions of the complete core, including fixed charges on working capital required for core fabrication and for nuclear fuel material, (c) a summary tabulation of certain computed performance and economic data, viz., average residence time, annual fuel throughput, unit electrical energy yield, annual power generation, and core fabrication costs, and (d) a tabulation of all input data for all regions. The printing of data described in (a) and (d) above is optional with program use. (ERA citation 08:020466)...Software Description: CDC6600; IBM360,370/195; FORTRAN IV; SCOPE 3.3 (CDC6600), OS/360,370.

AILMOE; Cross Section Calculation of Elastic Scattering Resonances.
R. A. Blaine.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-147 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048147 Price code: CP T13

AILMOE is a modified form of the ANL ELMOE program. The Fourier transform of the fast neutron flux is found for a mixture of moderators heavier than hydrogen with the moderator scattering law rigorously accounted for. (ERA citation 08:022428)...Software Description: IBM360; FORTRAN IV (H); OS/360; Minimum of 256K bytes.

EXTERMINATOR2; Two-Dimensional, Multigroup Diffusion Program.
T. B. Fowler, M. L. Tobias, D. R. Vondy, R. L. Brunnenmeyer, and R. A. Mickle.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-156 U.S. Sales Only. Price includes documentation. Tapes

can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048156 Price code: CP T12

The multigroup, two-dimensional neutron diffusion equations are solved in x-y, r-z, or r-theta geometry. Since FORTRAN IV variable-dimensioning techniques were used in EXTERMINATOR2, the only restriction on problem size is the available core storage. The code examines the problem size and stores fluxes and equation coefficients (except for scattering matrix coefficients which are recalculated at each iteration) according to the machine core size in one of four ways - (1) All fluxes and equation coefficients are contained in core and no I/O devices are used during the iterative part of the calculation. (2) All equation coefficients are contained in core and I/O devices are used to store the fluxes. (3) The fluxes are contained in core and I/O devices are used to store the equation coefficients. (4) Both coefficients and fluxes are used from I/O devices. (ERA citation 08:022429)...Software Description: IBM360;GE625;CDC6600; FORTRAN IV; OS/360 (IBM360), GECOS (GE625), and SCOPE (CDC6600); A machine with a minimum of about 64K words of core storage and 5 I/O devices for temporary storage in addition to those for input data and printed output. Some problems may require 4 additional I/O devices.

FLARE; Three-Dimensional Reactivity and Power Distribution.
D. L. Delp, D. L. Fisher, J. M. Harriman, M. J. Stedwell, and G. W. Perry.
General Electric Co., San Jose, CA. 1984, mag tape ANL/NESC-167 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048167 Price code: CP T11

FLARE is an inexpensive calculational method to determine core reactivity and core power distribution. A scoping calculation of this type is valuable in appraising the physics characteristics of planned test modes of operation so that detailed analysis can be reserved for those core calculations of greater interest from either a technician or safety standpoint. Because of the independent representation of the control rods, a three-dimensional calculational scheme was employed. This three-dimensional geometry combined with computer size limitations restricted the calculations to a relatively coarse mesh. The present version of the code will handle a maximum array of 14 x 14 x 12 nodes with either mirror or diagonal symmetry. (ERA citation 08:020494)...Software Description: GE635; IBM360; CDC7600; FORTRAN IV; GECOS (GE635), OS/360 (IBM360), and SCOPE (CDC7600); 39K and 3 tapes in addition to the system units are used on the GE365, 400K and 5 tapes or disks are required on the IBM360. 80,000 (octal) words of small core memory and 12,000 (octal) words of large core memory are needed for the CDC7600 version.

INVERSE KINETICS;R102; Space-Independent Inverse Kinetics Calculations.
J. J. Kaganove.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-168 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048168 Price code: CP T09

Given the space-independent, one energy group reactor kinetics equations and the initial conditions, this program determines the time variation of reactivity required to produce the given input of flux-time data. Maxima of 50 delay groups, 1000 data points, 99 data blocks (A data block is a sequence of input points characterized by a fixed time-interval between points, a smoothing option, and a number of repetitions of the smoothing option.). (ERA citation 08:020495)...Software Description: IBM360; FORTRAN IV; OS/360.

AISITE2; Parametric Site Requirement Study.
R. A. Blaine.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-172 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048172 Price code: CP T11

AISITE2 is largely based on methods proposed by the AEC in TID-14844 but differs in certain of the assumptions and models. The code automatically varies any one of 46 parameters such as reactor power, building leak rate, iodine clean-up rate, and halogen filter efficiency, computing the exclusion area, and low population boundary zones as functions of that parameter. The edit includes dose vs. distance data, fractional contribution by isotope group to the inhalation dose, and critical distances providing both printed and graphical data. Three models are available for fission product release with up to four levels of containment. Maxima of 100 isotopes 20 distances 10 values of variable parameter 8 organs 4 levels of containment. (ERA citation 08:020622)...Software Description: IBM360; FORTRAN IV; OS/360; 256K bytes storage.

2DF; Two-Dimensional, Multigroup Discrete Ordinate Code.
R. J. Archibald.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-173 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048173 Price code: CP T12

2DF is a two-dimensional, multigroup program written in FORTRAN for solving the neutron transport equation using the SN method. The program can determine the real or adjoint solution for x-y, r-z, or r-theta geometry. Isotropic, or a form of linear anisotropic, scattering may be considered. Various boundary conditions are allowed. The program also contains a number of search options whereby one can vary dimensions or concentrations to arrive at a predetermined eigenvalue. A distributed source may be specified. A library of cross sections is available on magnetic tape. Cross sections may be read from the library tape and/or from cards. Storage restrictions are specified by a complicated equation involving SN order, number of materials, mesh intervals, and energy groups, and specified boundary conditions. (ERA citation 08:022430)...Software Description: UNIVAC1108; FORTRAN V; EXEC8.

FORE2; Fast Reactor Excursion Calculations.
J. N. Fox, B. E. Lawler, H. R. Butz, and T. J. Heames.
General Electric Co., Sunnyvale, CA. Advanced Products Operation. 1984, mag tape ANL/NESC-174 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify

recording mode desired. Call NTIS Computer Products if you have questions.
DE83048174 Price code: CP T14

FORE2 is a coupled thermal hydraulics-point kinetics digital computer code designed to calculate significant reactor parameters under steady-state conditions, or as functions of time during transients. The transients may result from a programmed reactivity insertion or a power change. Variable inlet coolant flow rate and temperature are considered. The code calculates the reactor power, the individual reactivity feedbacks, and the temperature of coolant, cladding, fuel, structure, and additional material for up to seven axial positions in three channel types which represent radial zones of the reactor. The heat of fusion, accompanying fuel melting, the liquid metal voiding reactivity, and the spatial and the time variation of the fuel cladding gap coefficient due to changes in gap size are considered. Reactor excursions which can be calculated are restricted to those transients in which the reactor is not substantially destroyed. As a general rule, changes in reactor geometry and composition during an excursion are limited to those cases in which the reactivity effects of the changes may be considered as small perturbations of the initial system. Thus, accidents involving large-scale disassembly and bulk meltdown of a core are not covered by FORE2. FORE2 is valid only while the core retains its initial geometry. (ERA citation 08:020496)...Software Description: GE635; IBM360; FORTRAN IV; GECOS (GE635), OS/360 (IBM360); 3 files and 40K memory.

ISOTOPES; Maximum Yield from Reaction or Decay.
A. Furman.
Lockheed Missiles and Space Co., Sunnyvale, CA. 1984, mag tape ANL/NESC-179 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048179 Price code: CP T03

This program can be used to calculate for any neutron flux the optimum time of irradiation for maximum yield, the specific activity of the product isotope in curies per gram of target material, and the combined specific activity of the target and product isotopes. The product isotope may be produced by any simple reaction such as (n,gamma), (n,p), (n,2n), etc., or it may be produced by decay of a parent isotope. The number of flux values used may range from 2 to a maximum of 100 for each individual reaction and decay problem. (ERA citation 08:019902)...Software Description: UNIVAC1100; FORTRAN V; EXEC8: Less than 3600 words of memory were used in executing the sample problem.

BRT1; Thermal Spectrum Cross Section Calculations.
C. L. Bennett, and W. L. Purcell.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-184 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048184 Price code: CP T13

BRT1, like the original THERMOS code developed by H. Honeck of Brookhaven National Laboratory, computes the scalar thermal neutron spectrum as a function of position in a lattice by solving the integral transport equation with isotropic scattering. One-dimensional slab or cylindrical geometry may be used. As output the code supplies flux-averaged values of sigma a, sigma f, nu sigma f, sigma s, and d for the cell composition and the values of sigma a, sigma f, nu sigma f, sigma s, and sigma tr for the isotopic constituents. (ERA citation 08:020497)...Software Description: UNIVAC1108; FORTRAN V; CSCX; 64K memory, input, output, program, library, and punch units plus 3 scratch units or equivalent drum storage.

GAMTEC2; Multigroup Constant Calculations for 0 to 10 MeV.
L. L. Carter, C. R. Richey, C. E. Hughey, R. L. Brunnenmeyer, and R. A. Mickle.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-185 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048185 Price code: CP T15

GAMTEC2 generates multigroup constants in the energy range from 0 to 10 MeV for either homogeneous mixtures or heterogeneous arrays consisting of cylinderized lattice cells. The thermal group constants are averaged over (1) Wigner-Wilkins light moderator spectrum, (2) Wilkins heavy moderator spectrum, or (3) a Maxwellian distribution. For heterogeneous arrays the spatial thermal flux is calculated by a monoenergetic P3 approximation. For epithermal energies, the slowing-down distribution is described by either a B1 or P1 approximation to the Boltzmann equation. Resonance absorption and fission are treated by the Adler-Nordheim method. An improved method over that used in GAM1 for averaging the resonance absorption contribution to the multigroup constants is included. Fuel lumping effects on the fast fission of U238 and Th232 are treated by an n-flight collision probability technique. Group constants are punched on cards in HFN (diffusion code) and DTF (SN transport code) formats. The maximum number of concentric regions in the unit lattice cell is 16. Each region may contain up to 10 isotopes. Group constants may be computed for one thermal group and from 1 to 34 epithermal groups. (ERA citations 08:022431)...Software Description: UNIVAC1107;GE625;CDC6400; FORTRAN IV; EXEC2 (UNIVAC1107) and SCOPE 3.4 (CDC6400); The code requires the use of 2 tape units in addition to the usual input and output units - one for the single data library tape and one for temporary storage. Also, an on-line card punch or tape for punch output is required. The CDC6400 version uses disk as scratch storage.

CURIE; Fission Product Inventory Decay History.
A. E. Klickman, and P. H. Froehle.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-196 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048196 Price code: CP T09

CURIE calculates the fission product inventory decay history for fuel that has been in operation for a specified duration. The inventory decay history is provided for specified nuclides and elements, as well as the total fission products. Maxima of 20 decay times, 10 elements for which fission product histories are printed. (ERA citation 08:020498)...Software Description: IBM370; FORTRAN IV; OS/370; 250K bytes of storage are required.

HEATING2; Transient Steady-State Heat Transfer.
B. D. Belt.
Southern Services, Inc., Atlanta, GA. 1984, mag tape ANL/NESC-198 U.S. Sales Only. Price includes documentation.

Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048198 Price code: CP T09

HEATING2 is a generalized heat transfer code capable of solving transient and steady-state coordinate systems. The simplified input makes it a very useful code for those problems having geometrical configurations which can be described by parallel and perpendicular lines or planes, or concentric circles. These figures can be broken up into a maximum of 100 one-material regions with position and time-dependent volumetric heat generation rates. Up to 40 materials with constant properties can be described, and the initial temperatures of these regions are position-dependent. The boundaries of these regions can be contact, insulated, time-dependent temperature controlled, or forced convection with a time-dependent sink temperature. Also a radiation boundary with a time-dependent sink temperature is included. Maxima of 750 nodes 100 material regions 40 materials. (ERA citation 08:021407)...Software Description: IBM370,3033; FORTRAN IV; OS/370; 255K bytes memory and temporary use of a direct access device (unit 7) are required for execution. 300K bytes of memory were needed for FORTRAN IV H-Extended compilation.

DTF4; One-Dimensional, Multigroup Discrete Ordinate Program.
K. D. Lathrop, R. L. Brunnenmeyer, R. A. Mickle, and G. J. Duffy.
Los Alamos Scientific Lab., NM. 1984, mag tape ANL/NESC-209 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048209 Price code: CP T11

The linear, time-independent, Boltzmann equation for particle transport is solved for the energy space, and angular dependence of the particle distribution in one-dimensional slabs, cylinders, and spheres. Independent source or eigenvalue (multiplication, time-absorption, element concentration, zone thickness or system dimension) problems are solved subject to vacuum, reflective, or periodic boundary conditions. A complete energy-transfer scattering matrix is allowed for each Legendre component of the scattering cross section matrices. The variable dimensioning capability of FORTRAN IV has been utilized so that any combination of number of groups, number of spatial intervals, size of angular quadrature, etc., can be used that will fit within the total core storage available to a user. The code itself requires about 8000 words, but it can be shortened by deleting certain subroutines which perform optional calculations. (ERA citation 08:022432)...Software Description: IBM360;CDC6600;GE625; FORTRAN IV (CDC6600), FORTRAN IV and MAP (GE625), FORTRAN IV and BAL (IBM360); OS/360 (IBM360), and SCOPE (CDC6600); No disks or tapes are used. A clock is used but, by removing a few program statements, this requirement can be eliminated.

VARI-QUIR; Time-Dependent, Two-Dimensional, Multigroup Diffusion.
G. Collier, and E. L. Cox.
Westinghouse Electric Corp., Large, PA. Astronuclear Lab. 1984, mag tape ANL/NESC-212 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048212 Price code: CP T11

The time-dependent, multigroup, two-dimensional neutron diffusion equations are solved in x-y or r-z geometry. Maxima of 4 groups 6 precursor groups 36 regions 20 different materials. (ERA citation 08:022433)...Software Description: CDC6600;IBM360; FORTRAN IV; SCOPE (CDC6600) and OS/360.

FSDP3; Pointwise Cross Sections from Breit-Wigner Parameters.
D. R. Mathews.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-216 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048216 Price code: CP T09

FSDP3 computes pointwise cross sections from single-level Breit-Wigner resonance parameters. The maximum number of neutron energies is 5000 when the ENDF/B format input option is used and limited only by computing time considerations otherwise. A maximum of 3000 resonances per l-J state may be used with the ENDF/B format input option and 3000 s-wave resonances with the old input format. The number of resonances to be considered on each side of each neutron energy may be the same as the total number of resonances per l-J state except when the multilevel Breit-Wigner scattering option is used in which case a maximum of 100 resonances per l-J state on each side is allowed. Relative orbital angular momentum values l greater than 3 are not allowed (l= 0 is an s-wave interaction). The mathematical assumptions needed to express the results in terms of the conventional Doppler line shape functions may be invalid at very low neutron energies. The basic formulation is incomplete for the very high temperatures attainable in stars or in nuclear explosions. (ERA citation 08:022434)...Software Description: UNIVAC1108; FORTRAN V; EXEC8; 50,511 (decimal) words for data storage plus 7995 words for instructions, an optional cross section output tape, and 2 scratch files (tape or drum) are required.

RELOAD FEVER; One-Dimensional, Few-Group Diffusion Depletion.
C. L. Wang.
Institute of Nuclear Energy Research, Lung-Tan (Taiwan). 1984, mag tape ANL/NESC-221 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048221 Price code: CP T12

RELOAD FEVER performs a few-group, one-dimensional depletion calculation which allows fuel in various stages of irradiation to be homogenized into the same region for purposes of the diffusion calculation but follows the depletion of each of the subregions separately. The calculation may be interrupted periodically for refueling one or more regions. Recycling is optional, and an unlimited number of refuelings may be performed. A control poison search is available, and concentration-dependent self-shielding factors may be applied to one lumped poison. Maxima of 4 energy groups, 100 mesh points, 20 diffusion regions, 32 subregions, 35 nuclides per subregion, 60 cross section sets. Reference report, GA-6612.

(ERA citation 08:020467)...Software Description: CDC CYBER73,175; FORTRAN IV; NOS/BE 1.2, 1.3; 67,000 (octal) words of memory are required for execution.

GAMBLE5; Two-Dimensional, Multigroup Diffusion in Xy and Rz Geometry.
J. P. Dorsey, and R. Froehlich.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-222 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048222 Price code: CP T14

The homogeneous 2-dimensional multigroup diffusion theory equations with arbitrary group-to-group scattering and arbitrary fission transfer are solved for heterogeneous assemblies in x-y and r-z geometry. Homogeneous logarithmic boundary conditions are used at the outer surface of the assembly and at the surface of non-diffusion regions. The results include the group and point-dependent neutron fluxes, the power distribution, the neutron multiplication factor (k-effective), and a detailed neutron balance. Maxima of 10 energy groups 255 different material regions 20,000 space mesh points (16,043 cards). (ERA citation 08:022435)...Software Description: UNIVAC1108; FORTRAN IV and Assembly language; VERSION IX and EXEC2, GAX23; 65,536 words of core storage and 3 tape units on one data channel, 1,572,864 words of FH-880 drum storage from one data channel, and a peripheral printer.

WAMPUM; Fuel Cycle Costs Performance Study.
F. D. Tyson.
United Engineers and Constructors, Philadelphia, PA.
Technical Computer Services. 1984, mag tape ANL/NESC-224 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048224 Price code: CP T09

This program calculates fuel cycle costs on a detailed basis, using results of nuclear depletion calculations and certain specified economics assumptions. The purpose is to provide a measure of performance for comparing or optimizing fuel cycles and associated reactor core and fuel element characteristics. (ERA citation 08:020468)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.3.

OPUS; Power Plant Performance and Price Study.
J. E. Gratteau.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-226 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048226 Price code: CP T13

The code generates a flow network equivalent to a gas-cooled nuclear power plant of specified electrical output (in the range of 100 to 1000 MW) according to input data and programmed rules, proceeds to evaluate the plant performance and price of the turbogenerator set (according to General Electric price data), and prints as a result a coded list of all plant components and a detailed performance map. Power levels from 100 to 1000 megawatts are acceptable. A maximum of 100 turbogenerator arrangements can be included. Systems up to 100 nodes leading to no more than 749 equations can be studied. (ERA citation 08:020469)... Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 32K machine with 5 tapes besides input and output tapes.

HFN; One-Dimensional, Multigroup Diffusion in Slabs, Cylinders, and Spheres.
J. R. Lilley, and A. J. Bell.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-241 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048241 Price code: CP T11

HFN solves the homogeneous or inhomogeneous one-dimensional multigroup diffusion equation for its lowest eigenvalue and the corresponding direct and/or adjoint eigenvectors. Inhomogeneous boundary conditions and a flexible scatter-transfer matrix structure are included. Optional calculations include criticality searches, detector activation traverses, and integrals for perturbation theory analysis. (ERA citation 08:022436)...Software Description: UNIVAC1107;CDC6600,CYBER74; FORTRAN IV (99.9%) and SLEUTH-II (0.1%) (UNIVAC1107), FORTRAN IV (CDC6600); CSC EXEC2 Package B (UNIVAC1107), SCOPE 3.4 (CDC6600); 64K UNIVAC1107 with 786,432 word drum (exclusive of system requirements), a tape unit, on-line printer, card reader and clock. The CDC version requires 122K (octal) words of memory.

FLOW-MODEL; Multi-Channel Two-Dimensional, Two-Phase Flow.
G. W. Perry, and C. L. Wang.
Middle South Services, Inc., New Orleans, LA. 1984, mag tape ANL/NESC-246 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048246 Price code: CP T03

FLOW-MODEL is a multi-channel, two-dimensional, two-phase flow model designed to compute the axial and radial coolant density and quality profiles, the axial pressure profile, and the weight flow distribution for an open matrix flow, boiling water reactor. Maxima of 20 channels 100 axial nodes 100 axial q points. (ERA citation 08:020318)...Software Description: IBM360; CDC CYBER73; CDC6600,7600; FORTRAN IV; OS/360 (IBM360), SCOPE (CDC6600,7600), NOS 1.3 (CDC CYBER73); 240K bytes of memory are needed for the IBM360 version. The CDC CYBER73 version requires 47,000 (octal) words of memory on the CDC6600 and 35,000 (octal) words of memory on the CDC7600.

FLANGE1; Scattering Law Cross Section Calculation.
G. M. Borgonovi.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-247 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048247 Price code: CP T09

FLANGE1 computes neutron scattering kernels for a large class of moderators. Neutron scattering kernels are obtained from the scattering law computed by the code GASKET. FLANGE1 allows the calculationsulation of double differential cross sections, angular cross sections, total cross sections, and Legendre moments of the scattering kernel. The short

collision time approximation is used for energy transfers larger than the maximum provided by GASKET. (ERA citation 08:022437)...Software Description: UNIVAC1108; FORTRAN V; EXEC2; 32K memory, 2 magnetic tapes, one scratch unit.

LASER; Spectrum Calculations with Burnup in Cylindrical Lattices.
C. E. Carson.
Tennessee Valley Authority, Chattanooga. 1984, mag tape ANL/NESC-249 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048249 Price code: CP T14

LASER is based on modified versions of the slowing-down program MUFT and the thermalization transport theory program THERMOS, and performs a calculation of the neutron spectrum in a uniform lattice made up of cylindrical rods, cladding, and surrounding moderator. The thermal cutoff in LASER is 1.855 eV. The program performs a burnup calculation for the lattice. The spatial distribution of burnup within the fuel rods is explicitly calculated. The program will, at option, account for all non-linearities and mutual connections in the system of burnup equations. This calculation accounts for the variation of the neutron flux in space and energy during each time-step. A buckling, and a boron poison, criticality search are provided as options. Output includes edits in the energy range 0 to 0.625 eV. This version of LASER is restricted to one-dimensional, cylindrical geometry. The maximum number of space points is 14, with a maximum of 5 space points in the fuel region. The code is restricted to 4 mixtures (moderator, non-absorbing heavy scatter, cladding, fuel). The moderator can be either light water (Nelkin or free gas scattering kernel), or heavy water (Nelkin scattering kernel). The cladding material can be stainless steel, aluminum or zircalloy-2. The fuel can be a metal oxide or cermet. The epithermal and fast energy ranges include 50 energy groups. The thermal range includes 35 energy groups. Only the U235 chain (through U236) and the U238 chain (through Pu242) are available in the code. The fission products are separated into Xe135, the directly-produced Sm149, and all other fission products lumped into one pseudo fission product. The cross sections for the lumped fission products are represented by polynomials in the burnup. The spatial distribution of U238 resonance cap. (ERA citation 08:020499)...Software Description: IBM360,370; FORTRAN IV; OS/360; 150K with library tape and 2 scratch units.

SAFE-AXISYM; Stress Analysis of Axisymmetric Load.
C. L. Wang.
Institute of Nuclear Energy Research, Lung-Tan (Taiwan). 1984, mag tape ANL/NESC-251 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048251 Price code: CP T11

SAFE-AXISYM is a program for the analysis of multi-material axisymmetric composite structures. It is designed for the analysis of heterogeneous structures such as reinforced and prestressed concrete vessels. The structure is assumed to be linearly elastic, and only bodies of revolution subjected tc axisymmetric loading can be treated. (ERA citation 08:021307)...Software Description: CDC CYBER73;CDC7600; FORTRAN IV; NOS 1.3 (CDC CYBER73), SCOPE 2.1 (CDC7600); 62,000 (octal) words of memory are required for execution.

SAFE-PLANE; Plane Stress Analysis, Two-Dimensional Bodies.
D. C. Cornell, and C. L. Wang.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-252 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048252 Price code: CP T09

SAFE-PLANE is applied to two-dimensional structures of arbitrary geometry under in-plane loads. Either plane stress or plane strain conditions may be imposed. Mechanical and thermal loads are permitted. Multi-material structures with varying rigidities converge very slowly. Not valid for incompressible materials. Maximum number of nodal points = 675. Maximum number of elements = 1350. (ERA citation 08:021308)...Software Description: UNIVAC1108;CDC6600; FORTRAN IV; Approximately 47000 words storage (decimal) plus the operating system (1108). Requirements can be easily reduced by simple adjustment of DIMENSION statements.

SAFE-SHELL; Stress Analysis of Thin Shells.
D. C. Cornell.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-253 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048253 Price code: CP T09

SAFE-SHELL is used to design and analyze axisymmetric thin-shell structures of arbitrary generatrices under axisymmetric mechanical and/or thermal loading conditions. The intersection of two or more shells can be treated. Maxima of 181 nodal points 180 elements 21 sections 20 nodes per section. Capacity can be easily increased at cost of storage requirements. (ERA citation 08:021309)...Software Description: UNIVAC1108;CDC CYBER73;CDC7600; FORTRAN IV; EXEC8 (UNIVAC1108), NOS 1.3 (CDC CYBER73), SCOPE 2.1 (CDC7600); The UNIVAC1108 version requires 26,000 words of memory and the CDC CYBER73 version requires 76,000 (octal) words of memory for execution.

R101; Space-Independent Kinetics Kex Options.
J. J. Kaganove.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-255 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048255 Price code: CP T03

R101 solves the space-independent, one-energy group reactor kinetics equations to determine the time variation of neutron density given specified initial conditions. Any of four programmed representations of excess reactivity can be selected. (ERA citation 08:020500)...Software Description: IBM360; FORTRAN IV; OS/360; 240K bytes of storage.

MANTA; Steady-State Thermal-Hydraulic Analysis.
M. J. Stedwell, B. G. Atraz, and E. H. Novendstern.
General Electric Co., San Jose, CA. Nuclear Energy Div. 1984, mag tape ANL/NESC-256 U.S. Sales Only. Price

includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048256 Price code: CP T12

MANTA is a program which provides a thermal-hydraulic nodal analysis in the steady state. It was designed to analyze fuel element configuration in the superheat development program. MANTA analyzes mixing between coolant channels, allows for temperature variant conductivity in admittance calculations, and multiple stacked segments through the fuel region for a 7-element cluster analysis over a length of up to 8 feet. MANTA is designed for single-pass steam flow. The flow direction in the coolant channels may be either up or down, thereby permitting the analysis of two-pass as well as single-pass fuel elements. MANTA accounts for the heat transfer and pressure drop that may occur between coolant channels due to mixing as well as to the conventional heat transfer and pressure drop relationships due to friction, discontinuities, acceleration, convection, conduction, and radiation. MANTA allows for the calculation at each node of the material properties viscosity, specific heat, conductivity, and specific volume to correspond to the actual node temperature being solved for. The CDC6600 version uses sodium for the working fluid rather than steam. Maxima of 200 nodes 1 to 100 internal nodes 101 to 150 surface nodes 48 coolant nodes 24 coolant channels 20 segments 6 connections per node except for the coolant nodes which have 5. (ERA citation 08:020597)...Software Description: GE635;CDC6600,7600; FORTRAN IV; GECOS (GE635) and SCOPE (CDC6600); 35K GE635, with 3 scratch tapes.

REAX; Resolved Resonance Epithermal Cross Sectionss.
R. Protsik.
General Electric Co., Sunnyvale, CA. Advanced Products Operation. 1984, mag tape ANL/NESC-257 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048257 Price code: CP T09

REAX calculates epithermal flux, activities and cross sections as a function of radius and energy for a constant temperature fuel rod immersed in a homogeneous medium. Maxima of 5 fuel temperatures 5 moderating materials 3 fuel isotopes 30 first fertile isotope resonances 10 second fertile isotope resonances 80 fissile isotope resonances. (ERA citation 08:020598)...Software Description: GE635; FORTRAN IV; GE635 GECOS; 35K GE635 with input and output media.

EXPN; Analysis of Pulsed Neutron Source Data.
C. L. Peterson.
General Electric Co., San Jose, CA. Nuclear Energy Div. 1984, mag tape ANL/NESC-258 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048258 Price code: CP T09

EXPN analyzes pulsed neutron data using the Garelis-Russel technique (reference 1). Basically the code computes the prompt decay constant, alpha, and the parameter (k*beta/l) from experimental data, which is directly extracted from a time analyzer storage memory and read onto a punched paper tape. The alpha-determination part of the code was originally obtained under the name EXPLICIT from Knolls Atomic Power Laboratory but has since been modified. The code provides options for a pre-burst or a post-burst background analysis. That is, the parameters alpha and (k*beta/l) are obtained using a background measured prior to the burst or measured after the burst. (ERA citation 08:019904)...Software Description: GE635; FORTRAN IV; GE635 GECOS; 35K machine with input and output media.

MUSCAT; View Factor Shielding Code Cavity Geometry.
M. J. Gerber, and B. W. Roos.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-259 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048259 Price code: CP T11

MUSCAT computes the incident scattered neutron currents as a function of position within (1) the cavity formed by two truncated concentric spheres, (2) the cavity between two concentric circular cylinders, or (3) a cylindrical cavity. (ERA citation 08:022438)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 32K memory.

GADOSE;DOSET; HTGR Accident Analysis Dose Calculations.
D. B. Sedgley.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-261 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048261 Price code: CP T12

The GADOSE program calculates radioactivity and doses resulting from instantaneous accidental release of activity while the companion program DOSET includes the effects of a time-dependent accidental fission product release for the HTGR type of plant. Given an initial fission product inventory released into a reactor vessel or containment volume, the quantity of each isotope is calculated at a number of times at a number of locations (in the containment, containment recirculating cleanup filters, leak collector, plant exhaust filters and in the atmosphere at a number of distances from the plant). Each decay chain is calculated separately considering buildup and decay of each isotope. Radiological doses are calculated for any three body organs and the whole body based on meteorological and physiological input parameters. Fallout and rainout are included. The problem is restricted to 5 time solutions and 5 dose-distance solutions. There is no limit on the number of decay chains but each chain is limited to 6 isotopes. DOSET accepts up to 8 discrete fission-product activity additions as a function of time. (ERA citation 08:0020391)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 32K memory.

MACH1; One-Dimensional, Multigroup Diffusion in Slabs, Cylinders, and Spheres.
K. O. Ott, and W. G. Price, Jr.
Purdue Univ., Lafayette, IN. Dept. of Nuclear Engineering. 1984, mag tape ANL/NESC-262 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048262 Price code: CP T15

MACH1 performs one-dimensional multigroup diffusion solutions and associated calculations, including criticality searches, perturbation, reaction summary, beta effective, group collapsing, and pointwise reaction rates and ratios. Several card dumps of computed data are available on option. A spectral synthesis option is available in the IBM version. Maxima of 20 spatial regions 150 mesh points 28 energy groups 5 modal spectra (IBM360 version) 15 downscatter groups 20 isotopes per problem 20 homogenized materials 20 isotopes per homogenized material A special scatter treatment is used which allows full downscatter for hydrogen isotopes. (ERA citation 08:022439)...Software Description: CDC6500;IBM360,370/195; FORTRAN IV (CDC6500, IBM360-98%), BAL (IBM360-2%); OS/360 (IBM360) and SCOPE (CDC6500); The IBM360 version uses 5 tape drives and 1645K core storage assuming no overlay organization.

GASKET; Thermal Scattering Law Calculation.
J. U. Koppel, J. R. Triplett, Y. D. Naliboff, and D. H. Houston.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-263 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048263 Price code: CP T09

GASKET calculates the thermal neutron scattering law, s(alpha,beta), for a large class of moderators. Provision has been made in GASKET for the following dynamical modes of the scatterer - (1) free translation (gas), (2) diffusive or Brownian motion, (3) harmonic isotropic vibrations with continuous frequency spectrum, (4) harmonic anistropic vibrations with continuous frequency spectrum (as applied for instance to graphite), (5) harmonic isotropic vibrations with discrete frequency spectrum. Maxima of 100 points in distributed frequency spectrum 100 points in anisotropic part of the frequency spectrum 2 discrete oscillators if w sub 1 does not equal zero, otherwise 20 20 phonon terms calculated for each delta line. (ERA citation 08:022440)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 32K machine with about 26K available for the program and one scratch unit (drum, disk, or tape).

RSAC; Radiological Safety Analysis Program.
L. C. Richardson.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-265 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048265 Price code: CP T12

RSAC generates a fission product inventory from a given set of reactor operating conditions and then computes the external gamma dose, the deposition gamma dose, and the inhalation-ingestion dose to critical body organs as a result of exposure to these fission products. Program output includes reactor operating history, fission product inventory, dosages, and ingestion parameters.(ERA citation 08:020652)...Software Description: IBM360; FORTRAN IV and Assembly language; OS/360; 150K bytes and 1 tape drive.

CYGRO2; Stress Analysis of Cylindrical Fuel Elements.
C. M. Friedrich, and W. H. Guilinger.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-266R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048266 Price code: CP T11

CYGRO2 is used to determine stresses and strains during steady-state and transient power operation of an oxide-fueled, metal-clad rod-type fuel element in a pressurized environment. Major loading conditions include fuel swelling, fission gas and coolant pressure, clad growth and differential thermal expansion. The application for which the program has been developed is zircaloy tubes containing bulk oxide fuel. Axial and azimuthal symmetry of temperature and stresses is assumed. (ERA citation 08:020599)...Software Description: CDC6600; FORTRAN IV; SCOPE.

WATER; Steam Tables at 14.5 to 14,500 Psia and 32 to 472 exp 0 F.
W. A. Coffman, and L. L. Lynn.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-267R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048267 Price code: CP T09

WATER is a subroutine used to extract thermodynamic and transport properties of liquid, vapor, and supercritical water by tabular interpolation over the range of states: 14.5 to 14,500 psia and 32 to 1472 degrees F. These properties are specific volume, specific enthalpy, dynamic viscosity, and thermal conductivity, tabulated for pressure and temperature conditions. The largest errors for enthalpy, specific heat, specific volume, and thermal conductivity occur near the saturation curve, especially near the critical point. The largest error in viscosity occurs at low temperatures. (ERA citation 08:021149)...Software Description: CDC6600; FORTRAN IV; BKSB; The storage required for the property data is 2877 locations. Total storage requirement is about 4000 locations. There are no tape requirements.

CAESAR4; LIBLST; One-Dimensional, Multigroup Diffusion.
R. A. Blaine.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-270 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048270 Price code: CP T15

CAESAR4 solves the one-dimensional, multigroup, diffusion equations in any of three geometries and provides a wide choice of boundary conditions, criticality searches, edits and other auxiliary computations. Maxima of 20 regions 20 elements in library 12 elements per material 10 materials 100 intervals 35 groups 10 downscatter groups 20 groups and 15 elements in resonance cross section calculation. (ERA citation 08:022441)...Software Description: IBM360; FORTRAN IV; OS/360; 256K bytes.

CLIP; FORM Or THREDES Library Utility Routine.
R. A. Blaine.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-271 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048271 Price code: CP T13

CLIP is the cross section library preparation and maintenance program for FORM and THREDES. (ERA citation 08:022442)...Software Description: IBM360; FORTRAN IV; OS/360; 256K bytes.

FIGRO; LWBR Fuel Swelling Temperature Study.
L. L. Lynn, L. A. Waldman, I. Goldberg, and C. D. Sphar.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-272R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048272 Price code: CP T11

FIGRO calculates the one-dimensional steady-state temperature distribution and total fuel swelling for metal-clad, axisymmetric, bulk-oxide cylindrical fuel elements. The fuel pellet may be solid, annular, or contain two radial zones. Oxide fuel thermal conductivity is a function of temperature, depletion, and porosity. Fuel swelling is a function of temperature, depletion, internal hydrostatic pressure, and fissioning rate. Fuel-clad gap conductance is a function of gas composition, temperature, and gap thickness at operating conditions. Either the clad surface flux or the temperature at the inside radius of the fuel may be specified as a boundary condition for the heat conduction equation. Thermal expansion of the fuel and cladding is accounted for. Transient temperature calculations can then be performed starting from the steady-state solution with user-specified heat generation and water temperature tables. Each fuel zone may be subdivided into a maximum of 50 concentric equal-thickness annuli for the calculation of temperature and fuel growth. (ERA citation 08:020600)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1.

THREDES; One-Dimensional Few Group Diffusion Design System.
R. A. Blaine.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-273 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048273 Price code: CP T14

THREDES is a scientific applications programming system. Incorporated in this system are the necessary modules to perform parametric design studies of thermal reactors including the thermal cell homogenization (BAM), the fast spectrum calculation (FORM - NESC Abstract 51), reactor diffusion theory (FOG - NESC Abstract 28), and zero-dimensional burnup (KINDLE) calculations. These modules can be used in conjunction with one another or individually. Maxima of BAM - 10 regions 100 space points 20 isotopes per region FORM - 18 different isotopes FOG - 4 groups 238 space points KINDLE - 2 groups. (ERA citation 08:020501)...Software Description: IBM360; FORTRAN IV; OS/360; 256K bytes.

WIGL2; One-Dimensional, Two-Group Space-Time Diffusion.
A. V. Vota, L. D. Eisenhart, S. R. Johnson, E. T. Dugan, and R. E. Rogers.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-274R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048274 Price code: CP T12

WIGL2 is a one-dimensional two-group space-time diffusion theory program with zero, one, or six delayed neutron groups. The program will treat slab, cylindrical, and spherical geometries and includes non-boiling heat transfer. It accounts for xenon feedback and feedback effects due to fuel and coolant temperature. Control rod motion and control system feedback based on total core power or outlet coolant temperature can be simulated. Transients may be excited by prescribed changes in inlet coolant temperature, coolant flow rate, or rod position. For the 6600 no restrictions are placed on single parameters related to problem size. The total amount of storage set aside for all parameters is 14,000 memory locations. This allows the user to decide which area requires a more detailed representation. For the 1108 - let i = number of delay groups n = number of compositions ndt = number of changes in time-step size p = number of spatial points k = number of thermal-hydraulic regions r = number of nuclear regions then (3*ndt + (3+ i) * r + 40*n + 6*k + (8+ i)*p + i) less than or equal to 12,000 and (26*p + r + 16*k + 12) less than or equal to 16,000. (ERA citation 08:022443)...Software Description: CDC6600;UNIVAC1108; IBM370; FORTRAN IV; SCOPE 2.0 (CDC6600). EXEC 2 GAX27 (UNIVAC1108), and OS/370 (IBM370); On the 6600 WIGL2 requires 130,000 (octal) central memory words and one disk is used for storage of permanent files. The number of central memory words required could be decreased by decreasing the amount of storage set aside for parameters. On the 1108 64K of core memory and 2 tapes (input and output) are used. The 370 version uses 350K bytes of memory and a card punch.

PDQ8;PDQ7; One-, Two-, or Three-Dimensional, Few Group Diffusion Depletion.
W. R. Cadwell, C. J. Pfeifer, and C. J. Spitz.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-275R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048275 Price code: CP T99

The PDQ series of programs is designed to solve the neutron diffusion-depletion problem in one, two or three dimensions. Very large problems can be accommodated. The three-dimensional spatial calculation may be either explicit or discontinuous trial function synthesis. Up to five lethargy groups are permitted. The fast group treatment may be simplified P(3), and the thermal neutrons may be represented by a single group or a pair of overlapping groups. Adjoint, fixed source, one iteration, additive fixed source, eigenvalue, and boundary value calculations may be performed. The programs utilize the HARMONY system to allow for time-dependent representation of cross section variation and generalized depletion chain solutions. In PDQ8 the depletion is a combination gross block depletion for all nuclides as well as a fine block depletion for a specified subset of the nuclides. The geometries available include rectangular, cylindrical, spherical, hexagonal, and, in PDQ8 only, a very general quadrilateral geometry with diagonal interfaces. All geometries allow variable mesh in all dimensions. Various control searches as well as temperature and xenon feedbacks are provided. The total number of groups is limited to five, although six equations may be solved if the P(3) option is used. All storage is dynamic so no fixed problem size limits are imposed. (ERA citation 08:022444)...Software Description: CDC7600,6600,CYBER175,170;IBM360; PDQ8 - FORTRAN and COMPASS (RUN and FTN compatible); PDQ7 - FORTRAN IV and COMPASS (CDC CYBER175), FORTRAN

FTN4.6 (CDC7600), FORTRAN IV (H) and BAL (IBM360); PDQ8 - SCOPE 1.1 (CDC7600), SCOPE 3.3 (CDC6600); PDQ7 - NOS 1.2 (CDC CYBER175), SCOPE 2.1.4 (CDC7600), OS/360 (IBM360); On CDC systems the central memory size should be at least 65K, the program will utilize up to 1000K of extended core memory, and up to four disks transferring in parallel. The IBM360 version of PDQ7 requires at least 400K bytes of memory and auxiliary disk storage (Models 2314 or 3330).

AVOID; Annular Void Cross Section Calculation.
W. B. Henderson.
General Electric Co., Cincinnati, OH. Nuclear Materials and Propulsion Operation. 1984, mag tape ANL/NESC-276 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048276 Price code: CP T03

AVOID computes the equivalent diffusion coefficient and loss cross section of an annular void in a cylindrical reactor and the radial flux distribution in the void. (ERA citation 08:022445)...Software Description: GE625; FORTRAN IV; GECOS; 12K core memory exclusive of system use.

HAMMER;LITHE;HELP; Critical Analysis System.
H. C. Honeck.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-277 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048277 Price code: CP T15

HAMMER performs infinite lattice, one-dimensional cell multigroup calculations, followed (optionally) by one-dimensional, few-group, multiregion reactor calculations with neutron balance edits. Cell calculations - maxima of 30 thermal groups, 54 epithermal groups, 20 space points, 20 regions, 18 isotopes, 10 mixtures, 3 thermal upscattering mixtures, 200 resonances per group no overlap or interference single level only. Reactor calculations - maxima of 40 regions, 40 mixtures, 250 space points, 4 groups. (ERA citation 08:020502)...Software Description: IBM360; FORTRAN IV and BAL; OS/360; 512K bytes and 10 sequential data sets.

WHAM6; Liquid-Filled Piping System Analysis.
V. T. Berta, and H. Edwards.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-278 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048278 Price code: CP T09

WHAM6 is used to calculate pressure and velocity transients in liquid-filled piping networks. It can be applied to multiloop complex piping networks consisting of dead ends, elbows, orifices, multiple-branch tees, changes of flow passage cross section, check valves, pumps, pressurizers or tanks, and exit valves or breaks. Hydraulic losses are considered. Transients can be initiated either by closure or opening of one or more exit valves (equivalent to system ruptures) or by a prescribed gas pressure history in a pressurizer tank. Maxima of 100 legs 50 nodes per leg 2 different valves or breaks (additional ones have the properties of the second one) 4 pumps 1 pressurizer 1 case per execution. The limits of 100 legs and 50 nodes per leg are imposed by DIMENSION and DATA statements, and can be changed to accommodate other models whenever memory space is available. Applications using 244 legs, 26 nodes per leg, for the hydraulic model have been completed at EG and G. Turbine operation range is not considered because it is assumed that each pump is provided with a check valve. (ERA citation 08:020562)...Software Description: IBM360,370;CDC6600,7600; FORTRAN IV and BAL (IBM360). FORTRAN IV (CDC7600); OS/360,370 (IBM360,370), SCOPE 2.1.3 (CDC7600); 480K bytes of memory (IBM370/195), 101,000 (octal) words.

LEOPARD;SPOTS; Spectrum Calculations with Depletion.
R. F. Barry, and H. E. P. Krug, Jr.
Westinghouse Electric Corp., Pittsburgh, PA. Atomic Power Div. 1984, mag tape ANL/NESC-279 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048279 Price code: CP T12

LEOPARD is a unit cell homogenization and spectrum generation (MUFT-SOFOCATE type) program with a fuel depletion option. LEOPARD works with nuclides commonly used in water reactors. Thorium and U238 fuel chains are allowed. (ERA citation 08:020503)...Software Description: IBM360; UNIVAC1108; FORTRAN IV(H) (IBM360) and FORTRAN V (UNIVAC1108); OS/360 (IBM360) and EXEC2 (UNIVAC1108); 50K (decimal) memory.

M0807; Two-Dimensional Diffusion Absorption Removal Cross Sections.
C. H. Rutherford.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-280R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048280 Price code: CP T09

M0807 solves the two-dimensional fixed-source diffusion equation for the absorption and removal macroscopic cross sections required to yield a specified reaction rate distribution. Two geometries are permitted, rectangular and 60-degree parallelogram. In rectangular geometry 70x70 mesh points are permitted and 60x60 for parallelogram geometry. As many as 99 composition are allowed per problem. (ERA citation 08:022446)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; 64K core storage, card reader, printer, and one auxiliary storage unit.

SEALSHELL2;M0110; Shell Stress Analysis for Axisymmetric Loading.
C. M. Friedrich, P. G. Garside, and W. P. Kunkel.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-282R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048282 Price code: CP T11

The SEALSHELL2 program determines stresses, strains, deflections, and reactions in a thick shell of revolution with axisymmetric loading. The loading consists of a temperature distribution, inside and outside pressure distributions, and circumferential forces and moments applied to the middle sur-

face. The shell is linear-elastic with tensile, bending, and shear strains. (ERA citation 08:021310)...Software Description: CDC6600,7600;IBM360; FORTRAN IV; SCOPE 2.0 (CDC6600) and OS/360 (IBM360); 32K memory (CDC6600), 65K (octal) words memory (CDC7600), 185K bytes memory.

M0552; Dynamic Analysis of Linear Elastic Systems.
E. A. Zanoni.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-283R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048283 Price code: CP T09

M0552 solves the transient response problem of linear elastic, lumped-mass systems subjected to a unidirectional foundation transient that can be either a velocity or acceleration transient. Normal mode theory is used and the input to the program consists of the mode shapes, frequencies, and foundation transient. Element effects are also evaluated as a function of time. Modal damping coefficients may be specified. The total number of points used to describe the transient is limited to 2000. An option is provided to enable specification of a general trigonometric series having up to 20 terms, as the transient. The number of modes and mass points that can be considered is limited to 50. (ERA citation 08:021311)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; Input tape, output tape, 2 scratch tapes, printer, CDC-280 microfilm plotter.

M0555;ACT1; Loss-of-Coolant Accident Analysis.
G. M. Fuls.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-284R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048284 Price code: CP T11

This program will predict the pressure transient in the containment vessel as a function of time as a result of a major rupture in the primary system of a pressurized water reactor. Means are available for introducing water and heat into the containment vessel. There are also provisions for specifying various types of heat sinks for energy absorption. The temperature distribution in these heat sinks is calculated as a function of time. Discharge rates of the containment may also be determined as a function of both time and the internal pressure. There are three regular inflow tables, one table for spray flow, 20 heat sinks, two linear and one log-log heat input tables, and two special inflow tables for FLASH output. (ERA citation 08:020563)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0.

RESQ2;RESQ0;DBFL; Resonance Integral for a Hexagonal Cell.
B. L. Anderson.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-285R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048285 Price code: CP T13

RESQ2 calculates the resonance integral in a two-dimensional, hexagonal system consisting of fuel, clad and water with a reflecting boundary condition. Resonance isotopes are lumped together with an averaged mass. Maximum number of energy points = 8001. Maximum number of isotopes = 15. (ERA citation 08:020601)...Software Description: CDC6600; FORTRAN IV (98%) and ASCENT (2%); SCOPE 2.0; 40K memory, one tape for the library tape, one tape or disk for scratch.

HOT2; Two-Dimensional Transient Heat Conduction Program.
W. D. Peterson.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-286R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048286 Price code: CP T14

HOT2 is a digital computer program to solve two-dimensional plane and axially symmetric steady-state and transient heat conduction problems with diagonal boundaries and interfaces. Mesh spacing (at most 5000 points) is completely variable. As many as 99 regions are permitted in order to describe spatial variations in material properties, heat generation rates, and boundary conditions. The heat generation rate and boundary conditions may vary with time. Contact resistances are not included in the program computations, but must be approximated by use of thin regions of a low-conductivity material. Heat generation rates, boundary film coefficients, and boundary sink temperatures are assumed to be known. The program is intended to handle up to 99 regions, 5000 mesh points, 250 mesh points in each coordinate direction. (ERA citation 08:021408)..Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; 64K memory, card reader, printer, and punch, one system disk and 4 non-system disks, each on its own channel.

BISYN; Two-Dimensional, Multigroup Diffusion Synthesis Calculations.
P. Greebler, M. D. Kelley, R. A. Davis, C. E. Keck, and W. A. Duncan.
General Electric Co., San Jose, CA. Nuclear Energy Div. 1984, mag tape ANL/NESC-287 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048287 Price code: CP T15

BISYN solves the two-dimensional, multigroup, neutron diffusion equations in x-y or r-z geometry using a noniterative synthesis method. This approach is designed to greatly reduce the computer cost of running two-dimensional multigroup problems at the risk of some loss in accuracy of the detailed flux distribution. Maximum number of regions in each dimension = 8. Maximum number of mesh points in each dimension = 75. Maximum number of energy groups = 16. Maximum downscatter = 8. (ERA citation 08:022447)...Software Description: GE635;UNIVAC1108; FORTRAN IV; GECOS III, SDL1 (GE635) and EXEC2 (UNIVAC1108); 47,000 words of memory, disk, drum, and 2 tapes for the GE635. 54K of fast memory, 2 tape drives, 510,000 words of peripheral storage and the ability to segment for the UNIVAC1108.

GAKER; Inelastic Scattering Cross Section Calculations for Moderators.
D. H. Houston.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-289 U.S. Sales Only. Price includes documentation.

Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048289 Price code: CP T03

The GAKER code evaluates the inelastic, double-differential neutron scattering cross sections for moderators with phonon spectra which can be represented as sums of delta-functions. It is based on the original model for light water by Nelkin, which consisted of a translator, a hindered rotator (treated as an isotropic oscillator), and several vibrational oscillators. The code has been modified several times to include more oscillators and to treat anisotropic effects. Final energy-integrated cross sections are also calculated. Maxima of 75 energies 30 scattering angles 2 Legendre moments of the scattering kernel 3 vibrational oscillators. Only the latter may not be easily changed. Reference report. GA-5798 pp. 155-162, and Note. (ERA citation 08:022448)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 32K memory and 2 scratch files.

GASA (GA Stability Analysis); Stability Analysis for Reactor Kinetic Equations.
A. Baxter.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-290 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048290 Price code: CP T09

GASA determines the stability of any physical system whose motion is describable by a set of first-order linear differential equations. In particular GASA evaluates the stability of a reactor described by the linear reactor kinetics equations with temperature feedback, against perturbations about any operating power level. The program will also calculate and plot the transfer function between any state variable of the system and a given external forcing function (such as an external reactivity perturbation) or another state variable of the system. (ERA citation 08:020504)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 64K memory.

HEXSCAT; Elastic Scattering Cross Sections Hexagonal Lattices.
Y. D. Naliboff.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-291 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048291 Price code: CP T03

HEXSCAT calculates P0 through P3 components of the polycrystalline coherent elastic neutron scattering cross section per nucleus for a hexagonal lattice. The code averages point values over input group boundaries to give smoothed group cross sections. (ERA citation 08:022449)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 64K storage on the UNIVAC1108.

PSEUDO; Statistical Resonance Parameter Calculations.
D. Mathews, and L. G. de Viedma.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-292 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048292 Price code: CP T03

Resonance parameters are constructed from average nuclear properties in the unresolved resonance region. (ERA citation 08:022450)...Software Description: UNIVAC1108;IBM360; FORTRAN IV; EXEC2 (UNIVAC1108), OS/360 (IBM360); 15K memory.

M0899;HOH; Steam Tables 14.5-2538 Psia.
L. L. Lynn.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-294R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048294 Price code: CP T09

By making calls on a subroutine called HOH, M0899 edits thermodynamic and transport properties of water over the range 14.5 to 2538 psia and up to 608 degrees Fahrenheit below saturation and 932 degrees Fahrenheit above saturation. (ERA citation 08:021150)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; On the CDC6600 a FORTRAN IV compiler plus about 3000 storage locations for subroutine HOH and 10,000 locations for the main program.

FLASH3; Loss-of-Coolant Accident Analysis.
J. A. Redfield, J. H. Murphy, and V. C. Davis.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-295R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048295 Price code: CP T13

FLASH3 determines the transient response of a water-cooled reactor to a loss-of-coolant accident or severe variable pressure operation. The reactor plant must be represented by 20 or less pressure-determining nodes and 40 or less flow paths. The plant and core geometry are assumed fixed in time. Hence, the solution is not applicable after significant core melting. (ERA citation 08:020564)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 64K memory.

GRDWRK; Grid Generation for Safe Programs.
D. A. Doering.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-296 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048296 Price code: CP T09

GRDWRK generates as punched output the basic finite element reference grid work for the SAFE codes. This generated grid consists of triangular elements and nodes, uniaxial elements, such as reinforcement bars, tendons, and anchors, and biaxial membranes, such as any thin shell or liner. The punched output serves as direct input data to the SAFE codes. (ERA citation 08:021312)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2, GAX23B through GAX27; 20,100 words plus operating system.

GGC4; Multigroup Cross Sections Fast Thermal Spectra.
D. R. Mathews, and D. W. Drawbaugh.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-298 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half

inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048298 Price code: CP T15

The GGC4 program solves the multigroup spectrum equations with spatial dependence represented by a single input buckling. Broad group cross sections (shielded or unshielded) are prepared for diffusion and transport codes by averaging with the calculated spectra over input-designated energy limits. The code is divided into three main parts. A fast (GAM) section which covers the energy range from 14.9 MeV to 0.414 eV, a thermal (GATHER) section which covers the energy range from 0.001 to 2.38 eV, and a combining (COMBO) section which combines fast and thermal cross sections into single sets. Basic nuclear data for the fast section which consists of fine group-averaged cross sections and resonance parameters is read from a data tape. The fine group absorption and fission cross sections may be adjusted by performing a resonance integral calculation. Utilizing a fission source and an input buckling, the code solves the P1, B1, B2, or B3 approximation to obtain the energy-dependent fast spectrum. Two or six spatial moments of the spectrum (due to a plane source) may also be evaluated. Instead of performing a spectrum calculation, the user may enter the Legendre components of the angular flux directly. For as many input-designated broad group structures as desired, the code calculates and saves (for the combining section) spectrum-weighted averages of microscopic and macroscopic cross sections and transfer arrays. Slowing down sources are calculated and saved for use in the lower energy range. Given basic nuclear data, the thermal section of GGC4 determines a thermal spectrum by either reading it as input, by calculating a Maxwellian spectrum for a given temperature, or by an iterative solution of the P0, B0, P1, or B1 equations for an input buckling. Maxima of 99 fast groups 101 thermal fine groups 99 fast broad groups 50 thermal broad groups 50 broad groups in the combining section 250 resonances per nuclide 2 moderators admixed with a resonance absorber 305 entries in the escape probability table for cylindrical geometries 505 entries in the escape probability table for slab geometries. The energy dependence of the input bucklings is restricted to separate energy-independent fast- and thermal-section values (positive, negative or zero values are allowed in either section). (ERA citation 08:022451)...Software Description: The program is written in FORTRAN versions 5 and 4 for implementation on a UNIVAC1108 and CDC6600, respectively, under the EXEC8 and SCOPE operating systems. Maximum memory requirement is 64K (with 11 tape units) for the UNIVAC1108, 165K (octal) with overlay for the CDC6600.

LION4;LION; Three-Dimensional Temperature Distribution Program.
E. J. Binney, D. Bartkowski, G. Krevolin, and A. Peronilla.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-299R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048299 Price code: CP T11

LION4 is a computer program for calculating one-, two-, or three-dimensional transient and steady-state temperature distributions in reactor and reactor plant components. It is used primarily for thermal-structural analyses. It utilizes finite difference techniques with first-order forward difference integration and is capable of handling a wide variety of bounding conditions. Heat transfer situations accommodated include forced and free convection in both reduced and fully-automated temperature dependent forms, coolant flow effects, a limited thermal radiation capability, a stationary or stagnant fluid gap, a dual dependency (temperature difference and temperature level) heat transfer, an alternative heat transfer mode comparison and selection facility combined with heat flux direction sensor, and any form of time-dependent boundary temperatures. The program, which handles time and space dependent internal heat generation, can also provide temperature dependent material properties with limited non-isotropic properties. User-oriented capabilities available include temperature means with various weightings and a complete heat flow rate surveillance system. (ERA citation 08:020565)...Software Description: CDC6600,7600;UNIVAC1108;IBM360,370; FORTRAN IV and ASCENT (CDC6600,7600), FORTRAN IV (UNIVAC1108A,B and IBM360,370); SCOPE (CDC6600,7600), EXEC8 (UNIVAC1108A,B), OS/360,370 (IBM360,370); The CDC6600 version plotter routine LAPL4 is used to produce the input required by the associated CalComp plotter for graphical output. The IBM360 version requires 350K for execution and one additional input/output unit besides the standard units.

SAFE-CREEP; Viscoelastic Analysis of Concrete.
F. De Arriaga.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-300 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048300 Price code: CP T09

SAFE-CREEP performs a viscoelastic analysis of plane or axisymmetric composite concrete structures with age- and temperature-dependent creep data.(ERA citation 08:021151)...Software Description: UNIVAC1108; FORTRAN IV; 65K memory and 13 tapes.

FREVAP6; HTGR Metallic Fission Product Release.
V. H. Pierce.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-301 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048301 Price code: CP T09

The FREVAP type of code for estimating the release of longer-lived metallic fission products from HTGR fuel elements has been developed to take into account the combined effects of the retention of metallic fission products by fuel particles and the rather strong absorption of these fission products by the graphite of the fuel elements. Release calculations are made on the basis that the loss of fission product nuclides such as strontium, cesium, and barium is determined by their evaporation from the graphite surfaces and their transpiration induced by the flowing helium coolant. The code is devised so that changes of fission rate (fuel element power), fuel temperature, and graphite temperature may be incorporated into the calculation. Temperature is quite important in determining release because, in general, both release from fuel particles and loss by evaporation (transpiration) vary exponentially with the reciprocal of the absolute temperature. Maxima of 5 isotopes 10 time intervals for time-dependent variable 49 segments (times number of isotopes) 5 different output print time-steps. (ERA citation 08:020602)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2, GAX27; 64K memory with 2 tapes.

GAFFE; Equilibrium Fuel Cycle Calculation.
S. Jaye.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-302 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048302 Price code: CP T11

A zero-dimensional calculation of feed fuel requirements is performed to produce a specified end of cycle multiplication factor for the equilibrium fuel cycle, given feed composition, length of cycle and reactor power. It is alternately possible to compute cycle length or feed enrichment. The code is a survey tool which assumes periodic refueling and permits complete or partial recycling of materials. The segregated fuel concept can be handled within the framework of the calculation. Maxima of 18 energy groups, 50 total nuclides, 3 nuclides with full transfer matrix. (ERA citation 08:020470)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; GAX27; 65K memory and 2 tapes.

BLOOST6; Combined Kinetics Two-Dimensional Heat Transfer.
M. H. Merrill.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-303 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048303 Price code: CP T13

BLOOST6 combines a reactor space-independent kinetics code with a two-dimensional heat transfer code, and a time-dependent spherical geometry heat transfer routine for fuel particles. The code is applicable to problems for which the space-independent form of the reactor kinetics equation is applicable. Two-dimensional heat transfer routines are limited to r-z geometry, 36 regions, 19 materials, 15 radial mesh points, 20 axial mesh points, 6 radial region boundaries, 10 axial region boundaries, and inner and outer axial coolants. Kinetics equations allow 6 delayed groups and 2 temperature coefficients. Two types of fuel particles are permitted. (ERA citation 08:020505)...Software Description: UNIVAC1108; FORTRAN IV and Assembly language; EXEC2, GAX27; 64K memory with 2 tapes.

PERT4; Two-Dimensional Perturbation in Xy, Rz, and R-theta Geometry.
W. W. Little, Jr.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-304 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048304 Price code: CP T09

PERT4 computes reactivity coefficient traverses in x-y, r-z, or r-theta geometry using the first-order perturbation equations in the diffusion approximation. Flux and adjoint input can be taken directly from 2-D calculations or synthesized from radial and axial 1-D calculations. The code can also be used to compute activity traverses for any cross section of any material, the neutron generation time, and the effective delayed neutron fraction. PERT4 will handle up to 26 energy groups with a 50 x 50 spatial mesh. (ERA citation 08:020506)...Software Description: UNIVAC1108; FORTRAN IV; 65K memory.

FCC4; Fundamental Mode Fast Reactor Cross Section Calculations.
W. W. Little, Jr., and R. W. Hardie.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-306 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048306 Price code: CP T11

FCC4 is a multipurpose data manipulation code for use in fast reactor analysis. The code can be used to - (a) compute resonance-shielded cross sections using data in the Russian format (shielding factors and infinite-dilution cross sections), (b) compute multigroup fundamental-mode flux and adjoint flux, (c) compute and punch group-collapsed microscopic or macroscopic cross sections in the DTF format, (d) compute fuel burnup at constant flux or power density. FCC4 will handle up to 40 energy groups and 10 downscattering terms with 14 isotopes. (ERA citation 08:020243)...Software Description: UNIVAC1108; FORTRAN IV; 65K memory.

HWOCR-SAFE; Two-Dimensional Monte Carlo Cell Calculation.
L. B. Levitt, and R. C. Lewis.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-307 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048307 Price code: CP T12

HWOCR-SAFE is a Monte Carlo thermal reactor analysis program designed for use with proposed HWOCR lattice configurations. It is a benchmark tool to check multigroup diffusion and transport calculations and to evaluate the effect of their use of geometric approximations. The HWOCR-SAFE program is a two-dimensional cell code in which the cell is assumed to be rectangular. Up to 20 material regions (zones) can be specified where one of the zones is completely described by the cell boundaries. All other zones are assigned concentric cylinders which lie within a cylinder described as outer wall boundary, or within the right circular cylindrical rods which are inserted in the innermost cylinder designated as the inner wall boundary. Up to 40 rods may be inserted, and 6 types of rod may be specified. (ERA citation 08:020507)...Software Description: IBM360; FORTRAN IV (H) and BAL; OS/360.

JUPITOR1;JP1; Coupled Channel Cross Section Evaluation.
L. G. de Viedma.
NEA Data Bank, 91 - Gif-sur-Yvette (France). 1984, mag tape ANL/NESC-308 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048308 Price code: CP T12

JUPITOR1 is used to perform coupled-channel calculations to evaluate the cross sections for the scattering of nuclear particles by various collective nucleii. Maxima of six states and 30 partial waves can be coupled at one time. If the projectile energy becomes negative in some excited channels this maximum is reduced to 25 partial waves. The maximum value of the orbital angular momentum is 69. Differential cross sections for up to 100 angles for any number of states can be computed unless a polarized beam or target is considered, in

which case the maximum is 35. (ERA citation 08:022452)...Software Description: IBM360; FORTRAN IV; OS/360; 300K bytes of storage.

TSN; Spatially-Dependent Reactor Kinetics.
W. A. Rhoades.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-309 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048309 Price code: CP T11

The time-dependent neutron transport equation is solved. Energy deposition is allowed to cause variation in the neutron cross sections for the core region, in the core density, and in core height. The result is a kinetics calculation including spatial dependence both in feedback effects and in neutron density. The results are summarized in a manner similar to point-kinetics codes, and spatial distributions are also given. Graphical summaries of the significant variables and spatial distributions are given. In the IBM360 version, either the neutron yield from fission or the thickness of a specified zone can be changed as an independent function of time as specified by the user. This provides two ways of allowing explicit reactivity variation with time. 2 velocity groups, 100 spatial intervals, 1-dimensional geometry S4 (cylindrical) or S6 (plane or sphere). (ERA citation 08:020508)...Software Description: IBM360; FORTRAN IV; OS/360; IBM360 Model 50H or larger.

GAKIN2; 10 Multigroup, Time-Dependent Diffusion.
E. T. Dugan.
Florida Univ., Gainesville. Dept. of Nuclear Engineering Sciences. 1984, mag tape ANL/NESC-310 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048310 Price code: CP T11

GAKIN2 solves the time-dependent multigroup neutron diffusion equations in one space dimension. Variable dimensioning permits accommodation of any number of energy groups, space points, and material regions, within the limits of available storage. The number of delayed neutron groups is limited to 6. The number of bytes allocated for data storage is a function of the dimension of COMMON block A. The size of A, which is also the value of the variable MAX, must be greater than 8(P(G+ D) + 2GD + 10G + G(G+ 1) + 25R + 19RG + RG**2 + 11P + 4PG + 2N + 50) where R is the number of regions, G is the number of neutron energy groups, D is the number of delayed neutron groups, P is the number of space points, and N is the number of test points for testing convergence and predicting transformation frequencies (recommended value is one or two times the number of material regions, R). (ERA citation 08:022453)...Software Description: IBM370; FORTRAN IV; OS/370; 275K bytes of storage on an IBM370/195.

BURNUP; Heavy Element Isotopic Burnup Analysis.
B. F. Rider, J. P. Peterson, Jr., F. R. Smith, and T. V. McLaughlin.
General Electric Co., Pleasanton, CA. Vallecitos Nucleonics Lab. 1984, mag tape ANL/NESC-311 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048311 Price code: CP T12

BURNUP correlates heavy element isotopic analysis with fission product neodymium, uranium, and plutonium concentrations in an irradiated uranium fuel for calculation of burnup (atom per cent fission and MWD/MT). Reactor parameters, including effective neutron absorption cross sections for all uranium and plutonium isotopes, capture-to-fission ratios for U235, Pu239, and Pu241, a two-group description of the neutron spectrum, the average neutron temperature, the reactor fast fission factor, and the distribution of the sources of fission among the fissionable nuclides are computed from the experimental data obtained from the mass spectrometric analysis of uranium, plutonium, and neodymium. A maximum of 50 samples can be run in any one case. Although a single sample can be processed, the averaging procedures for nuclear constants are most effective when 5 to 50 samples from the same fuel load are pooled in a single case. (ERA citation 08:020509)...Software Description: GE635; FORTRAN IV; GECOS; 32K memory and an on-line printer.

CINDER;M0102; Point Depletion Fission Product.
T. R. England, T. C. Gorrell, and J. H. Hightower.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-313 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048313 Price code: CP T11

CINDER is a four-group, one-point depletion and fission product program based on the evaluation of a general analytical solution of nuclides coupled in any linear sequence of radioactive decays and neutron absorptions in a specified neutron flux spectrum. The desired depletion and fission product chains and all physical data are specified by the problem originator. The program computes individual nuclide number densities, activities, nine energy-group disintegration rates, and macroscopic and barns/fission poisons at each time-step as well as selected summaries of these data. The program is limited to 500 total nuclides formed in up to 240 chains of 20 or fewer nuclides each. Up to 10 nuclides may act as fission product sources, contributing to power, and as many as 99 time-steps of arbitrary length are permitted. All stable nuclides must have a cross section if zero power time-increments are anticipated. (ERA citation 08:020510)...Software Description: CDC6600; IBM360; FORTRAN IV (CDC6600), FORTRAN IV and BAL.

GAFGAR;P3T;PROC;TAPCOP; Spectra and Group-Averaged Cross Section Calculation.
R. J. Archibald, D. R. Matthews, R. T. Shanstrom, C. A. Stevens, and R. M. Wagner.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-316 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048316 Price code: CP T12

The problem is to obtain very detailed neutron flux and current distributions as functions of energy considering explicitly the possible overlap effects between resonances of a resonance absorber and of mixtures of resonance absorbers and to use these distributions to prepare group-averaged cross sections and transfer arrays for use in fast reactor analyses. The maximum of 1740 fine groups in the GAF section may be subdivided into 10 or less sets of fine groups having a con-

stant lethargy width. The GAR section requires a uniform spacing between the maximum of 14,700 discrete velocities. The maximum number of nuclides in a problem is 20, and the maximum total number of broad groups (output for nuclear design calculations) is 99 with a maximum of 20 broad groups in the GAR section. (ERA citation 08:020511)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2, GAX33A; 52K of available fast memory and 5 magnetic tape units plus 5 scratch files (drum files are used on the UNIVAC1108) totaling about 600K in capacity.

GAPOTKIN; Space-Independent Reactor Kinetics.
P. K. Koch.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-317 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048317 Price code: CP T09

GAPOTKIN is a point-kinetics code that solves the space-independent kinetics equations for a very general form of the reactivity function. GAPOTKIN will handle up to 20 time zones and will allow for 50 power-dependent or energy-dependent reactivity coefficients per time zone if tables are used. General data are stored for up to 500 time-steps and time delay data are stored for 10,000 time-steps. (ERA citation 08:020512)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2, GAX29; GAPOTKIN requires 4100 storage locations. The data storage requirement is roughly 33,000 locations. Two I/O devices are required for reading and printing and one additional I/O device is necessary if the program is loaded from tape.

FEVER7; One-Dimensional Multigroup Diffusion and Depletion.
M. R. Wagner.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-318 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048318 Price code: CP T12

FEVER7 performs a multigroup, 1-dimensional depletion calculation which allows fuel in various stages of irradiation to be homogenized into the same region for purposes of the diffusion calculation but follows the depletion of each of the subregions separately. The calculation may be interrupted periodically for refueling one or more regions. Recycling is optional and there is no limit to the number of refuelings which may be performed. A control poison search is available and concentration dependent self-shielding factors may be applied to a number of lumped poisons. Maxima of 7 energy groups 151 mesh points 20 regions 60 subregions 45 nuclides per subregion fixed sets of heavy nuclides. (ERA citation 08:022454)... Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 65K UNIVAC1108 or 1107 and 3 tapes (input, output, system).

GASP7; One-Dimensional Burnup Power Distribution Search.
W. A. Simon, M. R. Wagner, and K. R. Van Howe.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-319 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048319 Price code: CP T12

GASP7 calculates the one-dimensional distribution of fissile and fertile materials in a nuclear reactor which will yield any desired power distribution during the burnup history of the reactor core. A poison and poison distribution search for a desired multiplication and minimum power distribution perturbation can also be performed. Maxima of 7 energy groups 4 thermal neutron energy groups 151 mesh points 20 regions 45 different materials in each region 80 different cross section sets. Downscattering from the fast groups into the next lower group only is permitted. The geometry assumed is cylindrical, and either radial or axial flux distributions may be calculated. (ERA citation 08:022455)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 65K UNIVAC1108 or 1107 and 3 tapes (input, output, system).

TEMCO7; Temperature Coefficient Calculation.
M. R. Wagner.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-320 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048320 Price code: CP T12

TEMCO7 computes reactor temperature coefficients. Maxima of 25 temperatures 3 fast energy groups 1-4 thermal energy groups 20 regions 151 mesh points 60 subregions 40 nuclides per subregions 80 cross section sets per temperature. (ERA citation 08:022456)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 65K UNIVAC1108 or 1107 and 3 tapes (input, output, system).

EXPALS; Least Squares Exponential Decay Curves.
C. D. Gardner.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-321 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048321 Price code: CP T09

This program fits by least squares a function which is a linear combination of real exponential decay functions. The function is y(k) = summation over j of a(j) * exp(-lambda(j) * k). Values of the independent variable (k) and the dependent variable y(k) are specified as input data. Weights may be specified as input information or set by the program (w(k) = 1/y(k)). Generally, it is desirable to have at least 10n observations where n equals the number of terms and to input k+ n significant figures if k significant figures are expected. (ERA citation 08:021289)...Software Description: CDC7600,6600; FORTRAN IV; SCOPE 2.1; EXPALS requires 74,062 (octal) words with the maximum number of observations or interpolated values (MMX) set at 200 and the maximum number of values for the lambda calculation (NMX) set at 25.

ISOSEARCH; Isotope Production Flux, Cross Section Calculations.
C. W. Friend, R. E. Lewis, and A. R. Jenkins.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-322 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048322 Price code: CP T09

The program was developed to calculate the unknown reaction cross section, flux value, or product activity in an isotope-production scheme consisting of two or three nuclides. (ERA citation 08:021290)...Software Description: IBM360; FORTRAN IV and BAL.

FRANTIC; Least Squares Fit Sum of Exponentials.
A. J. Strecok.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-324 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048324 Price code: CP T09

FRANTIC is designed to process raw counting data and to fit in the least squares sense these data to the multiple exponential growth and decay equations. The program can be used for sums of exponentials with positive, negative, or zero exponents and positive or negative coefficients. The program is designed to accommodate up to 400 data points for a maximum of 10 components. (ERA citation 08:021291)...Software Description: IBM370; FORTRAN IV; OS/370; FRANTIC uses approximately 180K bytes of storage for execution.

2DB; Two-Dimensional Multigroup Diffusion and Depletion.
W. W. Little, Jr., R. W. Hardie, T. J. Hirons, and R. D. O'Dell.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-325 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048325 Price code: CP T11

2DB is a flexible, two-dimensional (x-y, r-z, r-theta, hex geometry) diffusion code for use in fast reactor analyses. The code can be used to: (a) Compute fuel burnup using a flexible material shuffling scheme. (b) Perform criticality searches on time absorption (alpha), material concentrations, and region dimensions using a regular or adjoint model. Criticality searches can be performed during burnup to compensate for fuel depletion. (c) Compute flux distributions for an arbitrary extraneous source. Since variable dimensioning is employed, no simple bounds can be stated. The current 1108 version, however, is nominally restricted to 50 energy groups in a 65K memory. In the 6600 version the power fraction, average burnup rate, and breeding ratio calculations are limited to reactors with a maximum of 50 zones. (ERA citation 08:022457)...Software Description: UNIVAC1108;CDC6600; FORTRAN IV; 65K memory and three peripheral storage devices.

AIROS2A; Simulation of Reactor Dynamics.
A. N. Nickols.
Atomics International, Canoga Park, CA. 1984, mag tape ANL/NESC-326 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048326 Price code: CP T12

AIROS2A solves the space-independent reactor kinetics equations and provides for the determination of reactivity by solving in addition the discretized equations that represent the spatial heat and mass transfer model for several fuel channels. In addition, variation of the film coefficient with flow is accounted for along with the provision for flow decay and afterglow heating. Scrams can be initiated by delayed signals from instruments that sense any quantity calculated, e.g., power, inverse period or temperature. Generalized feedback equations are used to provide flexibility in the models that represent multichannel heat transfer including conduction and convection, energy, pressure and other phenomenon such as fuel melting, coolant boiling and voiding burn-out. The reactivity equation is also generalized. The reactivity feedback coefficients can be constant or vary as the square root or reciprocal of temperature. Furthermore, any feedback variable can be used to initiate a reactivity scram, each with a unique delay time. An input generator computes the conduction and convection coefficients for an n x m nodal, multichannel system using built-in tables of specific heat, density, conductivity and viscosity for the common fuel, structure and coolant materials, and performs an initial temperature calculation. The film coefficients may be specified or calculated using Lyon's equation or the Dittus-Boelter equation. Maxima of 15 delayed neutron precursor groups, 400 feedback variables, 90 feedback variables printed out any number of channels and nodes per channel within the limitation above are allowed. (ERA citation 08:020513)...Software Description: IBM360; FORTRAN IV (95%) and Assembly language (5%); OS/360; 256K byte IBM360 and an SC-4020 graphical display device.

DAFT1; Least Squares Fit for Fissile Nuclide Data.
D. R. Harris.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-327R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048327 Price code: CP T03

DAFT1 is a program for weighted least squares fitting of 0.0253 eV neutron data for fissile nuclides. The program also carries out computations relevant to discerning overall goodness of fit, particularly deviant data, and data whose improvement would lead to large reductions in error of each fitted parameter. Data are fitted for a maximum of 3 fissile nuclides. (ERA citation 08:022386)...Software Description: CDC6600; FORTRAN IV; 32000 (octal) central memory locations.

NURLOC-1.0; Loss-of-Coolant Thermal Analysis.
C. T. Walters.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-328 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048328 Price code: CP T11

NURLOC-1.0 performs core/pressure vessel thermal analysis for a nuclear reactor loss-of-coolant accident. Two-dimensional analyses, either single pins or cylindrical shells, are performed. (ERA citation 08:020319)...Software Description: CDC6400; FORTRAN IV; SCOPE; 65K or 32K memory with overlay.

M0457;PIPE; Elastic Stress of Piping System.
C. M. Friedrich.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-329R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048329 Price code: CP T11

PIPE performs an elastic stress analysis of a 3-dimensional piping structure with thermal stresses, redundant loops, and concentrated loads. Maxima of 100 positions to locate forces and elements 20 force-trails 25 applied loads 50 total loads 20 joint-condition loads 20 sets of material properties 20 sets of stiffness data 99 elastic elements. (ERA citation 08:021313)...Software Description: CDC6600; FORTRAN IV; 100,000 (octal) central memory and 3 tapes (input, output, storage).

ECCSA4; Loss-of-Coolant and Emergency Cooling.
R. A. Cudnik.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-330 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048330 Price code: CP T11

ECCSA4 predicts the thermal and hydraulic behavior of a single fuel rod and its associated core flow channel during a loss-of-coolant accident and subsequent emergency core cooling injection. The fuel rod can be represented by up to 11 radial nodes and 24 axial segments. Each axial segment has associated with it an equivalent axial segment of the fluid channel surrounding the fuel rod. Thus a maximum of 24 axial segments in the flow channel is allowed. (ERA citation 08:020566)...Software Description: CDC6400; FORTRAN IV; SCOPE 3.3; 110K octal memory, one tape for restart capability, one tape for plotting data if desired.

M0219;FLOT1; PWR Flow Transient Analysis.
G. M. Fuls.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-331R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048331 Price code: CP T11

FLOT1 will predict the steady-state flow and the flow transient due to the subsequent loss of power to all pumps and terminate the transient at a specified time or it will predict the flow transient in which only some of the pumps are lost. This latter transient may be terminated by a maximum transient time or by check valve closures in all loops in which pumping power is lost. In the latter event, the program will predict the subsequent steady-state flow distribution. The mathematical model, upon which the program is based, is limited to four loops with a maximum of three pumps per loop in parallel. (ERA citation 08:020350)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0. The program is designed for card input with both printed and plotted output. The number of core locations required is 55,000 octal.

SAFE-3D; Three-Dimensional Composite Structure Stress Study.
D. C. Cornell, K. Jadhav, and J. S. Crowell.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-332 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048332 Price code: CP T12

SAFE-3D is a finite-element program for the three-dimensional elastic analysis of heterogeneous composite structures. The program uses the following types of finite elements - (1) tetrahedral elements to represent the continuum, (2) triangular plane stress membrane elements to represent inner liner or outer case, and (3) uniaxial tension-compression elements to represent internal reinforcement. The structure can be of arbitrary geometry and have any distribution of material properties, temperatures, surface loadings, and boundary conditions. Maxima of 5000 nodes 16000 elements. The program cannot be applied to incompressible solids and is not recommended for Poisson's ratio in the range of nu between 0.495 and 0.5. (ERA citation 08:021314)...Software Description: UNIVAC1108;IBM360; FORTRAN IV (UNIVAC1108), FORTRAN IV and BAL (IBM360); EXEC2, GAX33A (UNIVAC1108) and OS/360 (IBM360); 52K fast memory storage and 8,000,000 auxiliary storage for the UNIVAC1108.

TOAD; Processing of Analyzer gamma-Ray Spectra.
D. D. Busch.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-333 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048333 Price code: CP T11

TOAD is used to process and analyze gamma ray spectra. TOAD will handle up to 100 spectra at a time from analyzers with 4096 channels or fewer. (ERA citation 08:022348)...Software Description: UNIVAC1108; FORTRAN IV and Assembly language; EXEC2, GAX33; 32K memory.

STEM; Matrix Generation for a System of BEAMS.
P. E. Duffy, and F. C. Carlson.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-337R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048337 Price code: CP T03

STEM calculates and punches out partially-coupled mass, stiffness, and internal load function matrices for a structural system of beams having prismatic segments. Shear deformation and rotational inertia are included in the calculations. The program is limited to a system of 14 beams. The maximum matrix size is 120 by 120. The number of beams plus the number of segments in one case cannot exceed 60. (ERA citation 08:021315)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.2; Field length of 50,000 octal.

TWIGL;TWIGGLE; Two-Dimensional, Two-Group Space-Time Diffusion Feedback.
J. B. Yasinsky, M. Natelson, L. A. Hageman, and T. J. Heames.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-338R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048338 Price code: CP T09

TWIGL solves the two-dimensional, two-group, space-time neutron diffusion equations in rectangular or cylindrical geometry in the presence of temperature feedback. The neutron diffusion and delayed precursor equations are differenced in both space and time. The thermal-hydraulic description is based on a no-boiling, one-pass model formulated in terms of regionwise-averaged coolant and fuel metal temperatures. Maxima of 37 spatial mesh points in the x or r direction 37

spatial mesh points in the y or z direction 2 energy groups 6 groups of delayed neutrons 20 difference material compositions 100 thermal-hydraulic regions for which the average temperatures are defined. (ERA citation 08:022458)...Software Description: CDC6600;IBM360; FORTRAN IV; SCOPE 2.0 (CDC6600) and OS/360; 64K memory.

GAUGE; Two-Dimensional, Few-Group, Neutron Diffusion in Hexagonal Geometries.
M. R. Wagner.
General Atomic Europe, Zurich (Switzerland). 1984, mag tape ANL/NESC-339 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048339 Price code: CP T12

The two-dimensional few-group neutron diffusion theory equations for a uniform triangular mesh are solved to obtain the multiplication factor and the spatial flux and power distribution of reactors with hexagonal core configuration. Complete reactor life histories with partial refuelling at a number of reload time-points can be calculated. At each discrete time-point a control rod search may be performed to maintain criticality at all times. The depletion scheme of all burnable nuclides is specified by the user at execution time. Three modes of operation are possible - (1) straight burnup calculation, (2) control rod criticality search, allowing the adjustment of a number of control rod banks according to a prescribed rod sequencing scheme, and (3) a series of static calculations with insertion of rods into fixed, prescribed positions. Maxima of 1519 hexagonal fuel or reflector elements 4405 mesh points 4 energy groups with downscattering only into the next lower energy group 280 burnup regions 40 burnable nuclides 80 microscopic cross section blocks 5 variable self-shielding factor tables. The flux is assumed to be zero at the outer reactor boundary. (ERA citation 08:022459)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2 (UNIVAC1108); 65K memory, one drum (or scratch tape) unit, input, output, and restart tapes.

POWERCO; Nuclear Station Electricity Costs.
F. D. Tyson.
United Engineers and Constructors, Philadelphia, PA.
Technical Computer Services. 1984, mag tape ANL/NESC-340 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048340 Price code: CP T03

POWERCO calculates the cost of electricity produced by nuclear power stations, assuming all cash expenses such as investment and fuel costs, operating expenses, and taxes are known. The power cost is held constant throughout the project life. Maximum of 180 time periods. (ERA citation 08:020471)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.3.

GANDY3; Unresolved Resonance Cross Section Calculation.
P. K. Koch, and D. Mathews.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-341 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048341 Price code: CP T09

GANDY3 evaluates temperature-dependent effective neutron capture, fission, and scattering cross sections in the unresolved resonance region from average resonance parameters. GANDY3 will handle as many temperatures as desired for a maximum of 100 energy points. Consideration is given to neutron orbital angular momenta through d-wave (L= 2). (ERA citation 08:022460)...Software Description: UNIVAC1108; FORTRAN IV; EXEC8; GANDY3 requires about 8300 locations for instructions and 22,700 locations for data. Two I/O devices are required for reading and printing and one additional I/O device is necessary if the program is loaded from tape.

M0648; One-Dimensional Slab Transport with Slowing down.
L. Lois.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-342R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048342 Price code: CP T09

M0648 solves the one-dimensional slab transport problem with slowing-down for an arbitrary spatial external source and arbitrary scattering. Maxima of 17 energy groups 12 regions 8 Legendre polynomial expansion coefficients 99 equally-spaced mesh-points per region 440 mesh points 10 material compositions. No composition can consist of a multiplying medium or of a pure absorber. The boundary conditions can be arbitrary incident on either end or symmetry on one or both ends of the slab. (ERA citation 08:022461)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; 154K (octal) memory and 4 tape units for scratch storage.

M0756;LETO; One-Dimensional Slab gamma-Ray Transport.
L. Lois.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-343R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048343 Price code: CP T11

LETO will solve the gamma ray transport and energy deposition problem in one-dimensional laminar slab geometry. The energy group scheme is employed to account for photon energy degradation. An arbitrary external spatial isotropic source may be specified with an arbitrary energy spectrum. The boundary conditions may be (a) free boundaries with arbitrary incident, (b) symmetry on the left arbitrary incident on the right, and (c) symmetry on both ends. Maxima of 12 regions 10 materials 13 groups 151 mesh points per region 435 total mesh points 171 total energy mesh points 8 terms in the double range Legendre polynomial expansion of the (flux 8 terms in the Legendre polynomial expansion of scattering. (ERA citation 08:022462)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; 140K (octal) memory and 3 tape units for scratch storage.

GEM; Eigenvalue Problem for Vibrating Systems.
R. L. Fagan, and R. B. McCalley.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-344R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording

modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048344 Price code: CP T11

GEM is intended primarily to perform vibration studies with the capability of generating input for the VEP (vibration eigenvalue problem) routine and performing additional operations on the output from the SHO (shock) segment. Given a system of masses and springs, the VEP routine computes the natural frequencies of the vibrating system as well as the mode shapes for each frequency. Given the mode shapes, frequencies, and masses of a vibrating system, the SHO routine will compute the deflections and forces at the mass points. Maxima of 60 degrees of freedom (VEP) 98 commands per case. (ERA citation 08:021316)...Software Description: CDC6600; FORTRAN IV and ASCENT; SCOPE 2.0.

GAND; GAFGAR Cross-Section Library Preparation.
R. J. Archibald, and D. R. Mathews.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-345 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048345 Price code: CP T12

GAND prepares the cross sections needed for detailed computations of neutron energy spectra in fast reactors from a file of basic nuclear data in the ENDF/B format. Maxima of 20 ENDF/B materials processed in a single problem 35 resonance levels on either side of the incident neutron energy. (ERA citation: 08:020514)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2, GAX35; 52K memory and 4 to 8 magnetic tape units plus 5 scratch files (drum files are used on the UNIVAC1108) totaling about 1310K in capacity.

CODILLI; Least Squares Analysis of Resonance Data.
D. B. Adler, and F. T. Adler.
Illinois Univ. at Urbana-Champaign. Dept. of Physics. 1984, mag tape ANL/NESC-347 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048347 Price code: CP T09

A least-squares analysis of neutron resonance data is performed using the multi-level expansion. The program can handle only one set of cross sections at a time. Options are provided for the analysis of reaction or total cross section data, and for the direct handling of transmission data. By option, one can include the multi-level interference or perform the fit in terms of superimposed symmetric Breit-Wigner lines, while the potential scattering interference is always included in the trial function for the total cross section. Provisions are given for Gaussian and non-Gaussian resolution functions. In the latter case, modification of one subroutine allows for adaptation to any kind of experimental conditions. The relevant convolution integrals involving the trial function are evaluated by Simpson integration with an optional number of integration steps. Besides the resonances to be fitted, the trial function contains an optional number of resonances having known parameters, which may represent resonances external to the region being fitted as well as resonances within the energy interval of interest, thus permitting impurity effects to be described, or, if needed, spin states separated. The analysis is limited to s-wave neutrons. A maximum of 32 resonance levels can be fitted while a maximum of 20 known resonances can also be introduced. Currently the program allows for 1000 energy points and their corresponding cross section values. (ERA citation 08:022463)...Software Description: IBM360; FORTRAN IV; OS/360; IBM360 and auxiliary storage (tape or disk) referred to as logical unit 9 in the program.

TOPS; Transient Thermodynamics of Pressurizers.
J. A. Redfield, and S. G. Margolis.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-348R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048348 Price code: CP T09

The TOPS program is a digital simulation of pressurizer dynamics based on a rigorous application of the first law of thermodynamics and phenomological heat and mass transfer laws with empirically determined coefficients. The program is useful in studying the thermodynamic paths of pressurizer transients and is convenient to use as a design tool. (ERA citation 08:021317)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; Approximately 100,000 octal locations.

RAUMZEIT; One-Dimensional Time-Dependent Diffusion Calculations.
C. H. Adams, and W. M. Stacey, Jr.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-352R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048352 Price code: CP T09

RAUMZEIT solves systems of one-dimensional, time-dependent, multigroup diffusion-type equations using either of two treatments of the time dependence, finite differencing or the time-integrated approach (see reference 2). Maxima of 6 energy groups (6 coupled diffusion-type equations) 300 mesh points 40 different material compositions 6 delayed neutron groups. (ERA citation 08:022464)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0 or SCOPE 3.1; 64K memory.

CINCAS; Nuclear Fuel Cycle Cost and Economics.
S. McLain, P. J. Fulford, M. C. Edlund, T. W. Craig, and P. Henline.
Purdue Univ., Lafayette, IN. 1984, mag tape ANL/NESC-354 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048354 Price code: CP T10

CINCAS is a nuclear fuel cycle cost code which may be used for either engineering economy predictions of fuel cycle costs or for accounting forecasting of such costs. Features of CINCAS include - (1) monthly calculation of dollar costs and mass inventory on a batch and case basis for each month of a period which is usually defined as (but not restricted to) beginning with the delivery of fuel to the reactor site and ending with the withdrawal of fuel from the reactor. (2) a general formula for the unit price of enriched uranium which allows for variable feed and tails enrichments, costs of feed, chemical conversion, separative work, and losses in conversion and fabrication. Government ownership or leasing of fuel is not allowed, and Th233 fuels are not covered, nor has consideration been given to breeder reactors. The in-core time

spanned by all batches of a case must be no more than 40 years. (ERA citation 08:020472)...Software Description: IBM360; CDC6600; FORTRAN IV; OS/360 and SCOPE.

MC-2; Fast Neutron Spectra and Multigroup Cross Sections.
H. Henryson, II, B. J. Toppel, and C. G. Stenberg.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-355R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048355 Price code: CP T99

MC**2-2 solves the neutron slowing-down equations using basic neutron data derived from ENDF/B data files to determine spectra for use in generating multigroup neutron cross sections. The current edition includes the ability to treat all ENDF/B-V representations, high-order PL scattering representations, a free-format input processor, isotope mixing, delayed neutron processing, and flexibility in output data selection. The program uses variable dimensioning throughout so that computer storage requirements depend on a variety of problem parameters. Space requirements range from approximately 400K to 1000K bytes on IBM equipment depending on the complexity of the problem. (ERA citation 08:022465)...Software Description: IBM360,370;CDC7600; FORTRAN IV (99%) and Assembly language (1%) (IBM370), FORTRAN IV (99%) and COMPASS (1%) (CDC7600). The IBM version of MC**2-2 may be executed under OS or VS operating systems and compiled using the FORTRAN H or program product compilers with the highest level of optimization. The CDC7600 version of MC**2-2 has been implemented on both the Lawrence Berkeley Laboratory and Brookhaven National Laboratory computers with their respective COKE/SCOPE operating systems. The SEGMENTATION LOADER is required and directly addressable LCM is used. The code was compiled using the FORTRAN Extended compiler under OPT= 2 optimization; A large amount of fast peripheral storage is required. Storage requirements depend on problem complexity but virtually any reasonable problem may be executed on IBM equipment with 800K bytes or CDC equipment with 50,000 words of SCM and 100,000 words of directly addressable LCM.

ZPR-III Assembly 48 GAFGAR ENDF/B Data Tapes.
A. Baxter.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-356 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048356 Price code: CP T14

A benchmark study of ZPR-III Assembly 48 using ENDF/B cross sections was undertaken to identify possible cross section discrepancies in the microscopic ENDF/B data. This work was done for the CSEWG testing subcommittee as part of their Phase I data testing. This package contains the cross section data generated for this study in the form of the ultrafine group cross sections of the materials of ZPR-III Assembly 48 in the format of the GGA GAF/GAR program data tapes. The two GAF tapes have 1038 fine groups starting at a lethargy of -0.4 with a delta u spacing at 0.01 for 960 groups to a lethargy of 9.2 followed by 78 groups with a spacing of 0.1 delta u to a lethargy of 17.0. The GAR tape has 14,457 points starting at 1.237663 times 10**6 m/s (8.007 keV) with a constant delta v of 85.0 m/s to 8.903 times 10**3 m/s (0.414 eV). (ERA citation 08:020515)...Software Description: UNIVAC1108; Variable-length binary records.

TWOTRAN2; Two-Dimensional, Multigroup Transport in Xy, Rz, and R theta Geometries.
K. D. Lathrop, and F. W. Brinkley.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-358 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048358 Price code: CP T14

TWOTRAN2 solves the two-dimensional multigroup transport equation in (x,y), (r,theta), and (r,z) geometries. Both regular and adjoint, inhomogeneous and homogeneous (keff and eigenvalue searches) problems subject to vacuum, reflective, periodic, white or input-specified boundary flux conditions are solved. General anisotropic scattering is allowed and anisotropic inhomogeneous sources are permitted. Variable dimensioning is used so that any combination of problem parameters leading to a container array less than MAXLEN can be accommodated. On IBM machines, TWOTRAN2 will execute in the 4-byte mode so that any combination of problem parameters leading to a container array less than MAXLEN can be accommodated. MAXLEN can be several hundred thousand and most problems can be core-contained. On the CDC machines MAXLEN can be slightly greater than 40,000 words and peripheral storage is used for most group-dependent data. (ERA citation 08:022466)...Software Description: CDC7600,6600;IBM360/195; FORTRAN IV; Five output units, five interface units (use of interface units is optional) and two system input/output units are required. A large bulk memory is desirable, but it can be replaced by disk, drum or tape storage.

PUN1; Unresolved Resonance Integral Cross Sections.
N. M. Steen.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-359R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048359 Price code: CP T09

PUN1 evaluates unresolved radiative capture integrals and related multigroup cross sections. The unresolved distributions may have various orbital angular momentum quantum numbers and the effects of Doppler broadening and self-shielding are included. No more than 20 spin states per case and 54 energy groups are allowed. An arbitrary energy-weighting spectrum of up to 498 points may be used, but all points must be positive (w(e) greater than 0). (ERA citation 08:022467)...Software Description: CDC6600; FORTRAN IV; SCOPE 3; 40,000 (octal) locations of central memory storage are required.

TOR; Thermal Scattering for Crystalline Materials.
W. W. Clendenin, and R. Labauve.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-360 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048360 Price code: CP T11

The TOR program calculates the scattering law for a crystalline material in the incoherent approximation, from the

phonon frequency distribution and a specified temperature. A proportional quantity is punched in the form of a table for interpolation of the double differential cross section. As an alternative, the program obtains the analogous quantities for a monatomic gas. The phonon frequency distribution is specified by 4 to 201 points. (ERA citation 08:022546)...Software Description: CDC6600; FORTRAN IV; SCOPE; 32K memory.

GLEN; Group Constant Calculations from TOR Output Data.
W. W. Clendenin, and R. Labauve.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-361 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048361 Price code: CP T11

The GLEN program interpolates values of a factor proportional to the scattering law from the punched output of the TOR code (NESC Abstract 360). The differential cross section determined from these is integrated over the scattering angle to obtain coefficients of an expansion in Legendre polynomials of this angle for L = 0, 1, 2, 3. Integration over final energies yields values of the total scattering cross section and transport cross section. For each of a series of isotopic compositions (up to 10 compositions) the GLEN code calculates the diffusion length and values of the flux-weighted group average macroscopic scattering, absorption, fission, and transfer cross sections. A maximum of 87 energy points, and 20 groups in the collapsed structure are allowed. Each composition is limited to four heavy, non-moderating isotopes besides the moderator. (ERA citation 08:022468)...Software Description: CDC6600; FORTRAN IV; SCOPE; 64K memory.

WELWING; Material Buckling of Cylindrical Fuel Elements.
O. G. P. Grosskopf.
South African Atomic Energy Board, Pretoria. 1984, mag tape ANL/NESC-362 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048362 Price code: CP T09

WELWING was developed to calculate the material buckling of reactor systems consisting of annular fuel elements in heavy water as moderator for various moderator to fuel ratios. The moderator to fuel ratio for the maximum material buckling for the particular system is selected automatically and the corresponding material buckling is calculated. Up to 32 different materials in the fuel element may be used. (ERA citation 08:020603)...Software Description: IBM360; FORTRAN IV; OS/360.

BLAST; Reactor Kinetics Temperature Distribution Study.
O. G. P. Grosskopf.
South African Atomic Energy Board, Pretoria. 1984, mag tape ANL/NESC-363 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048363 Price code: CP T03

BLAST has been developed to study accident conditions in critical and subcritical thermal multiplying systems. The program computes the time behavior of the thermal neutron density and the system temperature following a step-change in reactivity. The integrated thermal neutron density is also computed, from which the total number of fissions during an excursion may be obtained. (ERA citation 08:020516)...Software Description: IBM360; FORTRAN IV; OS/360; 128K bytes of storage.

SNEQ; Nonlinear Algebraic Equation Solutions and Curve Plotting.
G. L. Lechliter.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-364R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048364 Price code: CP T11

SNEQ consists of the two codes, SNAP and EQPLT, which have been merged due to their common use of the SLIP compiler. SNAP interprets and solves pseudo-FORTRAN input equations representing nonlinear algebraic systems. EQPLT interprets pseudo-FORTRAN input equations and calculates and plots multiple curves on a single graph. EQPLT is useful for parameter studies. In SNAP the maximum number of unknowns is 50. In EQPLT the pseudo-FORTRAN equation is two-dimensional, having an independent variable, a dependent variable, and a parameter. The parameter may assume up to 6 values for any one graph, 100 constant values, and up to 200 values for the independent variables. (ERA citation 08:022827)...Software Description: CDC6600; FORTRAN IV and ASCENT.

ISOGEN; Radionuclide Generation and Decay.
H. H. Van Tuyl.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-367 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048367 Price code: CP T11

ISOGEN calculates radioisotope generation and decay, using two-group neutron cross sections. Maxima of 30 time-steps involving either irradiation or decay 50 members in a single chain 500 nuclides in a single case. (ERA citation 08:019905)...Software Description: UNIVAC1108; FORTRAN V; EXEC2; 65K memory and one tape very helpful, but not essential.

FLANGE2/71-1; ENDF/B Thermal Scattering Data.
H. C. Honeck, and D. R. Finch.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-368 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048368 Price code: CP T11

FLANGE2 takes cross sections, angular distribution, resonance parameter, and thermal scattering law data from ENDF/B Format II or III data tapes and prepares thermal multigroup cross sections and scattering matrices. Maximum energy groups = 200. Maximum Legendre order = 5. (ERA citation 08:022469)...Software Description: IBM360; FORTRAN IV; OS/360; 40K single-precision words of high-speed core plus 3 tape (or disk) units.

RELAP4/MOD6; Transient Thermal-Hydraulic Study.

P. North, G. L. Singer, and J. E. Tolli.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-369 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048369 Price code: CP T99

RELAP4 has been developed to describe the behavior of water-cooled nuclear reactors subjected to postulated transients, such as those resulting from loss-of-coolant, pump failure, or power excursions. The program calculates fluid conditions such as flow, pressure, mass inventory, and quality; thermal conditions such as surface temperatures, temperature profiles, and energy distributions; and heat fluxes in power generating and dissipating elements. The program also calculates reactor power, decay heat, and reactivity. In addition to describing transients in boiling-water and pressurized-water reactors, the program is sufficiently versatile to describe transients in experimental thermal-hydraulic systems. RELAP4/MOD6 was developed specifically to add a capability to the earlier RELAP codes for calculating PWR reflood phenomena. Maxima of 9 minor edit variables, 20 time-step cards, 20 trip control cards, 100 junctions (flow paths) between volumes, 5 bubble-parameter sets, 5 time-dependent volume descriptions on cards, 12 pumps, 75 control volumes, 10 check valve types, 5 normalized leak-area-versus-time curves, 20 fill system curves, 50 heat slabs, 20 heat slab geometries, 7 heat slab materials, 50 core sections, 99 data sets for heat exchangers without conduction. (ERA citation 08:020320)...Software Description: IBM360,370; CDC7600; FORTRAN IV (95%) and BAL (5%) (IBM360), FORTRAN IV (95%) and COMPASS (5%) (CDC7600); OS/360,370 (IBM360,370), SCOPE (CDC7600); 850K bytes (IBM360), 160,000 (octal) words of SCM and 200,000 (octal) words of LCM (CDC7600), 3 tape drives, and a CalComp plotter.

GAKIT; One-Dimensional, Multigroup Kinetics with Temperature Feedback.
R. Froehlich, S. R. Johnson, and M. H. Merrill.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-370 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048370 Price code: CP T13

GAKIT solves the multigroup, one-dimensional, time-dependent diffusion theory kinetics equations including delayed neutron effects and temperature feedback based on two-dimensional heat transfer calculations. For the one-dimensional multigroup kinetics equations an arbitrary scattering matrix and arbitrary fission transfer are allowed, and plane, cylindrical, or spherical geometry can be used. A piecewise linear time-dependent inhomogeneous source can be specified. Feedback is available from xenon buildup and temperature dependence of cross sections. The heat transfer calculation is performed for two-dimensional r-z fuel element models assuming predetermined axial power shape functions and time-dependent power amplitudes obtained from the one-dimensional kinetics calculations. For the fuel elements average fuel and moderator temperatures are calculated which determine, based on tables, the temperature-dependent cross sections. Transients may be introduced by step changes of cross sections, by piecewise linear time-dependent cross sections (rod withdrawal accidents), by step changes of the flow rates or by step changes of the coolant inlet temperatures. One-dimensional kinetics calculation - maxima of 10 prompt neutron energy groups 6 delayed neutron groups 10 homogeneous regions (channels) 100 mesh points. Fuel element geometry for heat transfer calculation - In the axial direction the fuel element may consist of a bottom reflector, a core section, and a top reflector. The bottom and top reflectors must have uniform densities and uniform thermal properties, while within the core section of the fuel element up to five radial regions may be used. Maxima of 15 radical mesh points 20 axial mesh points. The fuel elements in all the channels must have the same geometry, the same thermal properties, and the same inlet temperature, but the fuel elements of different channels may have different coolant flow rates and different axial power shapes. (ERA citation 08:022470)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2, GAX 23, but any other system with a segmenting facility can be used; 65,536 words of core storage and the facility for segmenting programs.

NOWIG; One-Dimensional, Two-Group Kinetics with Temperature Feedback.
J. B. Yasinsky.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-371R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048371 Price code: CP T09

NOWIG is used to solve the one-dimensional two-group neutron diffusion and delayed precursor equations using a shape-specified point-kinetics approximation. Feedback due to changes in the fuel metal temperature and coolant density is accounted for by using a model which is identical with that used in the WIGL2 (NESC Abstract 274) program. 2 energy groups must be used and up to 6 groups of delayed neutron precursors may be used. The maximum number of spatial mesh points is 250 and up to 20 material compositions and 50 thermal-hydraulic channels may be specified. (ERA citation 08:022471)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1.

RAPFU; Fuel Cycle Parameters for Fast Breeders.
P. Greebler, and C. Cowan.
General Electric Co., San Jose, CA. Advanced Products Operation. 1984, mag tape ANL/NESC-372 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048372 Price code: CP T09

RAPFU calculates equilibrium fuel cycle isotopics in fast breeder reactors. The recycled plutonium is permitted to have different isotopic compositions in two different core zones, and several recycle schemes are available as options. Output data includes the initial, average, and discharged fuel isotopic concentrations for each region of the core zones and the blankets, breeding ratio, doubling time, and (optionally) fuel costs calculated using simplified relationships. Four plutonium recycle schemes are available. The most complicated of these uses two core isotopic zones plus a zone containing the blanket zones. The other three use only a single core isotopic zone and allow a selection to be made from three alternate mixtures in the plutonium discharged from the core and blanket regions and recycled back into the core regions. Up to 100 regions of different composition may be used, and the regions within any zone of fixed plutonium input isotopic com-

position do not have to be connected. (ERA citation 08:020407)...Software Description: GE635; FORTRAN IV.

BL47; Drafting Tool to Plot Plane Structures.
C. M. Friedrich, and J. J. Cullens.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-373R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048373 Price code: CP T09

BL47 is a plotting routine designed for plane structures that are to undergo stress analysis. Points and lines are input in various parametric forms, and curved segments are drawn between given points along the given lines. The program may be used as a drafting tool to construct engineering drawings. BL47 uses three points on a straight line segment to obtain dimensions for SEALSHELL2 (NESC Abstract 282) input data. (ERA citation 08:021318)...Software Description: CDC6600; FORTRAN IV; SCOPE; 20,000 words of high-speed memory.

1DX; One-Dimensional Diffusion Fast Cross Section Generation.
R. W. Hardie, and H. Henryson, II.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-374 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048374 Price code: CP T13

1DX is a multipurpose, one-dimensional diffusion code for generating cross sections to be used in fast reactor analyses. The code is designed to - (a) compute and punch resonance shielded cross sections using data in the Russian (see reference 2) format, (b) compute and punch group-collapsed microscopic and/or macroscopic cross sections averaged over the spectrum in any specified zone, and (c) compute keff and perform criticality searches on time absorption, material concentrations, zone dimensions, and buckling using either a flux or an adjoint model. 1DX uses variable dimensioning to make maximum use of existing core storage. All subscripted variables are stored in one array dimensioned to 35,000 on the UNIVAC1108. Allocation is dynamic in the IBM version. (ERA citation 08:022472)...Software Description: UNIVAC1108;IBM360,370; FORTRAN IV (UNIVAC1108), FORTRAN IV and BAL (IBM360,370); OS/360,370 (IBM360,370); 65K memory and 7 peripheral storage devices (UNIVAC1108), 145K and maximum of 8 storage devices.

SCORE3; SCISRS ENDF/B Graphic Cross Section Evaluation.
C. L. Dunford.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-375 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048375 Price code: CP T19

SCORE3 is an interactive neutron cross section evaluation system. SCORE can display up to 500 experimental data points with their associated error bars. Up to 2 smooth curves may be overlayed on a display of experimental data points. Each curve is restricted to 150 points. (ERA citation 08:022473)...Software Description: IBM360; FORTRAN IV and BAL; OS/360, Version 14 or higher; IBM360 Model 50 or higher with 125,000 bytes of fast memory, an IBM2250 graphics console, Models 1, 2, or 3, 2 9-track tape drives, and 1 disk.

AVERAGE; Unresolved Region Average Cross Section Calculations.
M. R. Bhat.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-376 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048376 Price code: CP T03

AVERAGE calculates average scattering, capture, and fission cross sections from s- and p-wave data of the unresolved parameters of File 2 of ENDF/B. AVERAGE calculates average cross sections for up to 100 energy values in the unresolved region. It does not allow for inelastic scattering and calculates only s- and p-wave contributions. Width-fluctuation corrections can vary from 1 to 4. (ERA citation 08:022474)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; 18K (octal) memory.

SIGPLOT; Resolved Multilevel Briet-Wigner Cross Section Calculations.
M. R. Bhat, and D. Cullen.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-377 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048377 Price code: CP T09

SIGPLOT calculates the scattering, capture, fission, and total cross sections from resonance parameters of Version I data from File 2 of ENDF/B. Scattering cross sections may be calculated with or without level-level interference. Provision is also made to numerically Doppler-broaden any of the cross sections. SIGPLOT can handle resonance data up to a maximum of 10 different isotopes with a total number of 500 resonances and an L value not exceeding five. It further assumes that the resolved resonance parameters are given for one energy range which is the same for all the isotopes of an element. The mesh points at which the cross sections are calculated can be varied. Since the calculated data are not stored, an increase in the number of mesh points does not conflict with any storage requirements. (ERA citation 08:022475)...Software Description: CDC6600; FORTRAN IV; SCOPE 2.0; 37K (octal) memory.

TUBE; U-Tube Heat Exchanger Stress Analysis.
A. E. Spivak, and G. L. Lechliter.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-378R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording rnodes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048378 Price code: CP T09

TUBE solves for the stresses due to pressure and temperature in a U-tube type heat exchanger. Specifically, it handles a configuration consisting of a spherical head, primary transition cylinder, and secondary cylinder. The transition cylinders may be conical and tapered in thickness, but the remaining shells are of uniform thickness. The spherical head and the transition cylinders may be omitted from a problem. (ERA citation 08:021319)...Software Description: CDC6600; FORTRAN IV.

SAFE-2D; Plane and Axisymmetric Stress Analysis.
D. C. Cornell.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-379 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048379 Price code: CP T11

SAFE-2D performs the elastic stress analysis of general axisymmetric, plane, and combined axisymmetric and plane composite structures. Maxima of 2 degrees of freedom (radial or horizontal translation and axial or vertical translation) 1200 nodal points 2400 finite elements. (ERA citation 08:021320)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; SAFE-2D requires 50K, fast memory storage, and 500,000 words of auxiliary storage.

GATT; Three-Dimensional, Few-Group Diffusion Calculations in Hexagonal Geometries.
H. Kraetsch, and M. R. Wagner.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-380 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048380 Price code: CP T11

GATT is a three-dimensional few-group neutron diffusion theory program for calculating the detailed spatial flux and power distribution for reactors with hexagonal core configuration. The program uses a uniform triangular mesh in the horizontal mesh planes and assumes a relatively simple region structure in the axial direction. It was designed to represent the special patch-type core structure of the HTGR reactor as closely as possible. GATT allows downscattering from one group into the next and a maxima of 81 z-planes 104,487 mesh points 4 energy groups 40 macroscopic cross section sets (mixtures). It is assumed that all fission neutrons are born in group 1. (ERA citation 08:022476)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 65K memory and 10 files of drum storage with a total of 500,000 words capacity.

RAPP; High-Velocity Flow Study of Steam-Water Mixtures.
C. W. Sorenson.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-382R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048382 Price code: CP T03

RAPP computes the relationship among mass flow, pressure, and piping resistance (k-factor) for high velocity flow of a two-phase mixture of steam and water. The source fluid may be subcooled or saturated water, saturated steam, or a mixture of steam and water. The downstream pressure must be below the saturation pressure of the source fluid. Specific applications include pressurizer surge line pressure drop and pressure distribution downstream of a relief valve. Maxima of 6 flow areas for computing pressure distribution with known flow 2000 pressure increments. (ERA citation 08:021409)...Software Description: CDC6600; FORTRAN IV; SCOPE; 45K to compile and execute.

M0266; Linear Elastic Structural Dynamics.
W. A. Wenzel.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-383R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048383 Price code: CP T09

M0266 computes the dynamic shock forces and modal frequencies acting on a lumped mass, linear elastic model of a structure subjected to shock spectrum inputs. The model employed is a collection of lumped masses connected by weightless flexible elements. If the original structure is not statically determinate, redundant forces must be introduced to ensure a primary structure that is. M0266 is limited to a 50 x 50 mass-flexibility matrix. Other maxima include - 50 masses plus redundants 20 redundants 999 flexible elements 20 effects per element. The dynamic analysis is limited to a spectrum-type analysis, which is limited to a one-directional motion of the foundation. (ERA citation 08:021321)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 105,000 (octal) locations, input tape, output tape, one scratch tape, and printer.

CHECKER;CRECT;DAMMET;PLOTFB; SLAVE3 ENDF/B V1 Processing Codes.
D. E. Cullen, W. Kroop, S. Pearlstein, and O. Ozer.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-384 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048384 Price code: CP T14

This package of five programs is designed for processing ENDF/B (Evaluated Nuclear Data File Version B) Version I tapes. CHECKER checks that the ENDF/B tapes are in proper format and all fields are within specified limits, rather than the physics of the data library. Angular distributions reconstructed from Legendre coefficients are everywhere positive. CRECT, which can process ENDF/B Version III data as well as earlier versions, provides a means of correcting assembled data on a tape by insertion and deletion of data. DAMMET selectively merges data from one or two ENDF/B library tapes onto a final tape. The mode (BCD or binary) and arrangement (standard or alternate) may be changed during this process. PLOTFB processes ENDF/B library tapes which contain data embedded within a necessary library structure in order to produce comprehensive listings and/or plots. The listings and/or plots contain an extensive amount of information related to the data, such as temperature dependence, physical units of the data, interpolation laws for the data, cryptic titles defining the reaction type, etc. SLAVE3 provides modular subroutines which can be assembled to retrieve and process ENDF/B data for a specific problem. In CHECKER correct structure of the data tape is assumed and minor anomalies are noted. Common and major irregularities cause termination of execution accompanied by a core dump. In CRECT correct sequence and material fields of the data tape are assumed. In both CHECKER and CRECT data must be in ENDF/B BCD standard arrangement card image format. In DAMMET a specific reaction cannot be extracted from a tape unless it is within a file or material selected. (ERA citation 08:022477)...Software Description: CDC6600; FORTRAN IV; SCOPE3 (locally modified); For CHECKER 56,300 octal (approximately 24,000 decimal) words of core storage and one tape (or disk) unit (besides input and output units). For CRECT 13,000 octal words of core storage and two data

storage units. For DAMMET 61,000 octal (about 25,000 decimal) words of core storage and a maximum of five tape (or disk) units. For PLOTFB 73,700 octal (about 30,000 decimal) words of core storage and three tape (or disk) units. For SLAVE3 40,000 octal (approximately 18,000 decimal) words of core storage and one or two tape (or disk) units will be required for a typical job.

COHBE;PREP; Coherent Inelastic Scattering Law Calculations.
G. M. Borgonovi.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-385 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048385 Price code: CP T03

The programs, PREP and COHBE calculate the coherent one-phonon scattering law for polycrystalline beryllium, using an isotropic Debye-Waller factor as an approximation for beryllium. The Debye-Waller factor w is consistent with the definition exp**(-2*w*alpha) in the scattering law. (ERA citation 08:022478)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 45K memory and 2 magnetic tapes.

DATATRAN2; Modular Programming and Data System.
H. J. Kopp, and W. E. Schilling.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-386 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048386 Price code: CP T15

DATATRAN2 is a data base management system for a scientific and engineering modular program environment. DATATRAN consists of a set of extensions to the FORTRAN language designed to simplify the development, interconnection and use of large computer programs in a scientific and engineering environment. It allows users to easily connect a series of functional program units (modules) to perform a specific task. (ERA citation 08:022828)...Software Description: CDC6600,7600,CYBER176; FORTRAN (85%), COMPASS (15%); SCOPE 3.1, 3.2, 3.3 or SCOPE 3.4 (CDC6600 Edition B), SCOPE 1.1 (CDC7600 Edition B), and SCOPE 2.1 (CDC7600,CYBER176 Edition C); 64K memory, 2 disks, and permanent storage media such as tapes are required; in addition, CDC6600 usage requires 30K words of ECS and CDC7600 usage 20K words of LCM.

CITATION; One-, Two-, and Three-Dimensional Diffusion Depletion Using Multigroup Theory.
T. B. Fowler, D. R. Vondy, and G. W. Cunningham.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-387 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048387 Price code: CP T16

CITATION is designed to solve problems using the finite-difference representation of neutron diffusion theory, treating up to three space dimensions with arbitrary group-to-group scattering. X-y-z, theta-r-z, hexagonal-z, and triagonal-z geometries may be treated. Depletion problems may be solved and fuel managed for multi-cycle analysis. Extensive first-order perturbation results may be obtained given microscopic data and nuclide concentrations. Statics problems may be solved and perturbation results obtained with microscopic data. Citation has been designed to attack problems which can be run in a reasonable amount of time. Storage of data is allocated dynamically to give the user flexibility in dimensioning. Typically, a finite-difference diffusion problem could have 200 depleting zones. 10,000 nuclide densities, and 30,000 space-energy point flux values. (ERA citation 08:022479)...Software Description: IBM360,303X; FORTRAN IV; OS/360; IBM360/91 or equivalent with at least 128,000 32-bit words of directly-addressable main storage, 7 to 32 I/O devices depending upon the calculation, excluding input and output devices and system requirements.

ETOX3; Multigroup Constants from ENDF/B for One DImension.
R. B. Kidman, and H. Henryson, II.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-388 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048388 Price code: CP T13

ETOX3 (ENDF/B to 1DX) calculates multigroup constants for nuclear reactor calculations using data from the Evaluated Nuclear Data File (ENDF/B) Version II or Version III format. It can also process Version I materials that do not call for partial energy distribution laws 1, 2, 4, 6, or 8 (see END/F, File 5). The code is designed to compute and punch - (a) infinite dilute cross sections, (b) temperature-dependent, self-shielding factors for arbi- trary values of microscopic sigmao (total cross section per atom) in the Russian (Bondarenko) format, and (c) inelastic-scattering probability matrices. (ERA citation 08:022480)...Software Description: UNIVAC1108;IBM360,370; FORTRAN IV; Five tape units or equivalent random-access storage devices are required (3 are scratch units). The UNIVAC1108 version uses 65K words and IBM360,370 300K bytes of main memory.

STINT3; Single-Channel Space-Time Synthesis.
C. H. Adams, R. A. Rydin, and W. M. Stacey, Jr.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-389R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048389 Price code: CP T09

STINT3 solves static (eigenvalue) and time-dependent systems of coupled, one-dimensional, diffusion-type equations in slab geometry and is primarily intended for solving single-channel, flux-synthesis equations. The code provides for control rod motion and temperature feedback. Maxima of 6 equations (groups * modes) 50 axial mesh intervals 6 delayed neutron groups 40 control rod and temperature feedback channels. (ERA citation 08:022481)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 64K memory.

CORGAM; Unfolding of Complex gamma-Ray Spectra.
N. D. Eckhoff.
Kansas State Univ., Manhattan. Dept. of Nuclear Engineering. 1984, mag tape ANL/NESC-390 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048390 Price code: CP T09

A correlation algorithm is coded to allow the unfolding of complex gamma-ray spectra typically collected in a neutron activation analysis procedure. CORGAM (1) will compensate for electronic shifts in the data, (2) will correct for background, (3) will normalize the data to a fixed neutron flux level, (4) allows a choice of weighting factors, and (5) allows a choice of methods for calculation of standard deviations. The code requires a matrix of reference gamma-ray spectra. These spectra can be in raw-data form. All of the modifications available to the complex gamma-ray spectra are available to the reference gamma-ray spectra. In addition, a decay correction is available for the reference gamma-ray spectra. Only the reference gamma-ray spectra that have intensity coefficients which are significant at a prescribed level of significance are retained in the final solution. The intermediate solutions, i.e., those solutions that contain reference gamma-ray spectra which have nonsignificant intensity coefficients at the prescribed level, are printed out. Therefore, several solutions are imbedded in the final solution. Currently the program is restricted to a problem of 400 channels and 15 reference spectra. There would be no difficulty in expanding this to as many as 4096 channels. However, the number of reference spectra is limited by the accuracy desired in the inversion procedure. The inversion program currently being used would suffer (from the accuracy standpoint) if the number of reference spectra were greater than 25. (ERA citation 08:022559)...Software Description: IBM360/50; FORTRAN IV Level G; OS/360.

SORSDB; Pressure Vessel Stress and Fatigue.
F. C. Carlson, and R. E. Dobson.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-391R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048391 Price code: CP T03

SORSDB was written to calculate the stress intensities and fatigue usage factors for pressure vessels (structural members) in accordance with the ASME Code, Nuclear Vessels, Section 3. The input requires the basic membrane and bending stresses generated by the SOR2 code (NESC Abstract 80) or any adaptable shell program. The output includes stress differences, stress intensities, and fatigue usage factors. As many as 100 points on the vessel may be evaluated for a maximum of 15 operating conditions and 50 fatigue cycles. (ERA citation 08:020567)...Software Description: CDC6600; FORTRAN IV.

JITER; Fluctuation Experiment Analysis.
M. Natelson, and D. R. Harris.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-394R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048394 Price code: CP T09

JITER computes the following quantities measured in reactor fluctuation experiments - the dispersion parameter y, the modified coefficient of correlation MCC, the frequency dependent part of the power spectral density PSD, and the cross power spectral density CPSD. The kinetics model may have as many as 4 energy groups and up to 6 groups of delayed neutrons. Half the reactor core can be described with up to 300 spatial mesh points and as many as 5 different materials distributed in at most 50 spatial regions. A total of 10 modes can be used in the expansions. (ERA citation 08:020518)...Software Description: CDC6600; FORTRAN IV; 120,000 (octal) memory locations.

FLAC; Steady-State Flow, Pressure Distribution.
G. J. Malek, R. G. Olson, and P. L. Versteegen.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-395 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048395 Price code: CP T09

The flow analysis code FLAC calculates the steady-state flow and pressure distribution in an arbitrary network. The program includes the possibility of heat addition and mass addition in any portion of the network. The FLAC program does not consider two- phase flow or open-channel flow, as in hydraulics. (ERA citation 08:020568)...Software Description: UNIVAC1108;IBM370;CDC6600; FORTRAN V (UNIVAC1108) and FORTRAN IV (IBM370 and CDC6600); EXEC2 (UNIVAC1108), OS/370 (IBM370), SCOPE (CDC6600); The computer storage requirements for FLAC are flexible, and the size of the various arrays can be adjusted to suit any problem. With all arrays set to their maximum, a problem consisting of 1500 branches and 700 nodes requires approximately 50,000 storage locations on the UNIVAC1108. 180K bytes of memory are needed for the IBM370 version and 72,000 (octal) words of memory are required for the CDC6600 version.

WASP2; Water Properties for Safety Analysis.
D. A. Spragg, C. S. Caldwell, F. T. Dunckhorst, G. W. Swartele, and T. R. Feher.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-396R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048396 Price code: CP T12

WASP2 is a FORTRAN IV computer program which performs a spline function fit to data obtained from the WASP subprogram (see reference 1) for thermodynamic and transport properties of water and steam. The properties calculated by WASP2 are: pressure and temperature as functions of specific volume and specific internal energy; specific volume as a function of pressure and enthalpy; and viscosity, thermal conductivity, and specific heat as functions of pressure and temperature. The WASP2 procedures are restricted to be within a pressure range from below atmospheric to near critical for saturation states and for single phase vapor, and to over 10,000 psia for single phase liquid. The temperature range is approximately 40F to 650F for the liquid and from saturation temperature to approximately 2200F for the vapor regions. (ERA citation 08:021152)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE 3.3 (CDC6600), SCOPE 1.1 (CDC7600); The WASP2 procedure requires 200,000 (octal) words of CDC7600 large core memory (LCM) for storing the coefficients for the spline functional fit of the water and steam surfaces.

GAPL3; Inelastic Large Deflection Stress Study.
A. L. Thurman.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-397R U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048397 Price code: CP T11

GAPL3 determines the inelastic, large-deflection behavior of thin plates or axially symmetric shells with pressure loading and deflection restraints. The thickness of the plate or shell should fall within the limits of thin shell theory. (ERA citation 08:021322)...Software Description: CDC6600; FORTRAN IV and Assembly language; SCOPE; Minimum core storage of 100,000 (octal) words, a printer, an on-line punch, and a plotter.

BE21; Few-Group, Discrete Ordinates for Slab Geometry.
E. Schmidt.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-398R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048398 Price code: CP T11

BE21 solves the few-group discrete ordinates equations in slab geometry. Either homogeneous or inhomogeneous problems can be solved. The maximum number of ordinates is 60 which may be divided arbitrarily among the groups subject to the restriction that the ordinate schemes be symmetric about, but not include, mu= 0 in each group. The corresponding group number limit is 30 with two ordinates per group. Other limitations include - 20 compositions 50 regions 50 source regions. (ERA citation 08:022482)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 140,000 (octal) locations of fast memory and 2 scratch tapes.

SUMOR;M0271; S-Wave Neutron Cross Section Calculation.
D. R. Harris, and C. B. Noll.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-399R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048399 Price code: CP T09

SUMOR calculates s-wave neutron cross sections at selected energies. The cross sections are calculated in three approximations to r-matrix theory - the Reich-Moore approximation, the Feshbach, Porter, and Weisskopf approximation, and the sums of single-level formulae approximation. These calculated cross sections or, alternatively, input lists of cross sections, are Doppler-broadened using exact calculation for target nucleii in Maxwellian motion. Calculated cross sections or cross sections divided by neutron energy can be integrated between arbitrary energy limits. Level-level interference is not permitted in fission channels. SUMOR treats s-wave channels only, and potential cross section is approximated as independent of energy. (ERA citation 08:022483)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; SUMOR requires approximately 135,000 (octal) central memory locations. The number of central memory words could be decreased by decreasing the dimensions of the output cross sections. Also, one input and at least three output devices are required.

SAS1A; Fast Reactor Power and Flow Transients.
T. J. Heames.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-400 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048400 Price code: CP T13

SAS1A is used for the analysis of fast reactor power and flow transients. The program consists of four driver programs each called by the main program. These drivers handle the areas of (1) input/output, with diagnostics, (2) steady-state initialization, to define the core operating conditions before the initiation of the transient, (3) the transient portion, and (4) the disassembly (weak explosion) analysis. Maxima of 20 axial heat transfer nodes in a fuel pin, in the upper blanket, and in the lower blanket 6 delay groups, 60 regions used to describe the core, 200 axial segments in the coolant channel, 15 radial temperatures in the fuel. (ERA citation 08:020519)...Software Description: CDC6600; IBM360/75; FORTRAN IV; SCOPE (CDC6600) and OS/360 (IBM360); 410K bytes on the IBM360/75 (without overlays) and approximately 300K bytes on the IBM360/75 (with overlays).

GAMTRI; Two-Dimensional, Multigroup, Diffusion Triangular Mesh Geometries.
J. P. Dorsey, and R. Froehlich.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-401 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048401 Price code: CP T14

The homogeneous two-dimensional multigroup diffusion theory equations with arbitrary group-to-group scattering and arbitrary fission transfer are solved for heterogeneous assemblies in (uniform mesh) triangular geometry. Homogeneous logarithmic boundary conditions are used at the outer surface of non-diffusion regions. The results include the group- and point-dependent neutron fluxes, the power distribution, the neutron multiplication factor, and a detailed neutron balance. Maxima of 10 energy groups 20,000 space mesh points 255 different material regions. (ERA citation 08:022484)...Software Description: UNIVAC1108; FORTRAN IV (90%) and Assembly language (10%); EXEC2, General Atomic Version GAX 23; 65,536 words of core storage, 3 tape units on 1 data channel, 1,572.864 words of drum storage from 1 data channel, and a peripheral printer-punch.

SABOR4; Discrete-Element Analysis of Thin Shells.
E. A. Witmer, E. W. Mack, T. H. H. Pian, and B. A. Berg.
Massachusetts Inst. of Tech., Cambridge. Aeroelastic and Structures Research Lab. 1984, mag tape ANL/NESC-402R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048402 Price code: CP T12

SABOR4 is a discrete element displacement program for the linear-elastic, static, load-deflection analysis of meridionally-curved, variable-thickness, branched, thin shells of revolution which may be subjected to concentrated or distributed external loading and to isothermal or nonuniform temperature conditions. The program consists of five primary subprograms - HAL4, MELT4, LANCE4, MAINS4, and SUMPLOT4. Three of these (HAL4, MELT4, and LANCE4) process external-mechanical-load or thermal-load data to determine the generalized nodal forces for each discrete element. MAINS4 computes the discrete-element stiffness and mass matrices and

forms these matrices for the assembled structure. SUMPLOT4 calculates the other quantities of interest, sums contributions from various loading harmonics, and prepares results for CalComp plotting. (ERA citation 08:021323)...Software Description: IBM360; FORTRAN IV; OS/360.

FINEL; Finite-Element Study in Two- and Three-Dimensonal Structures.
W. B. Jordan, and L. A. Grieb.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-404R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048404 Price code: CP T09

FINEL is a collection of three programs for the calculation of the elastic and plastic behavior of structures. The structures are built up from plates and bars, which can be arranged in either 2-dimensional or 3-dimensional assemblies. The plates can be in plane stress or plane strain. FINEL2 handles 2-D structures only. FINEL3 can handle both 2- and 3-D structures, but is slower. FINEL2 maxima - 2000 nodes 1000 elements 4 types of materials 10 different materials of each type 100 groups 500 forces of any one type (x, y, or slant) 500 boundary conditions of any one type FINEL3 maxima - 30 nodes per group if the number of dimensions is 2, 20 nodes per group if the number of dimensions is 3, 100 groups 1000 elements. (ERA citation 08:021324)...Software Description: CDC6600; FORTRAN IV; CHIPPEWA.

NOAH; One-Dimensional, One-Group Space-Time Diffusion Feedback.
G. S. Lellouche.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-405 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048405 Price code: CP T11

NOAH solves the one-dimensional, one-group space-time diffusion equation accounting for the effects of fuel, clad, and coolant temperatures (or by changing subroutines fuel, coolant, and solid moderator temperatures) on fission and absorption cross sections, and on the diffusion coefficient and the transverse buckling. It can account for the effects of xenon-iodine feedback. If desired, it will determine long-time xenon-flux behavior assuming the temperatures to be in quasi-static equilibrium. Numerous methods of perturbation are allowed and control of the transient is also provided. Maxima of 6 groups of delayed neutrons 10 regions 500 space points. A new region is required when the feedback free value of any of the parameters is changed from the preceding region value. (ERA citation 08:022485)...Software Description: CDC6600; FORTRAN IV; SCOPE 2 or 3; 27K memory.

DATATRAN2 RAD1 Geometry Modules; Radial Geometry Modules for Two-Dimensional Input.
R. H. Bean, and H. J. Kopp.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-406 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048406 Price code: CP T14

This series of DATATRAN modules is designed to provide the computerized two-dimensional geometry descriptions required for engineering and nuclear design computations. The modules communicate via DATATRAN N-dot datasets, and the user must link the appropriate modules to perform a specific task. Modules are designed to accept as input data transcribed from engineering drawings, to plot, check, and edit the generated geometric data, and to calculate moments of inertia and area intersections. Curves are limited to straight-line approximations in most modules and to second-order curves in principal modules. The total geometric complexity is not limited. (ERA citation 08:021325)...Software Description: CDC6600,7600; FORTRAN (90%), COMPASS (5%), DATATRAN2 (5%); DATATRAN2 with SCOPE 3.1, 3.2, 3.3 or SCOPE 3.4 (CDC6600), SCOPE 1.1.

DATATRAN2 Utility Plotting Modules; Utility Plot Modules F(X) and F(X,Y).
H. J. Kopp, R. P. DiStefano, B. L. Hennig, C. N. Hodgins, and A. N. Lord.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-407 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048407 Price code: CP T12

This series of DATATRAN modules is designed to provide basic plotting capability in an easy-to-use package. Functions of one or two variables can be accommodated. The modules may be used to plot results of calculations performed by other modules or to display data read from cards or tapes. There is a limit of approximately 8,000 points per curve for functions of one variable and 16,000 points for functions of two variables. (ERA citation 08:021326)...Software Description: CDC6600,7600; FORTRAN (80%), COMPASS (15%), DATATRAN2 (5%); SCOPE 3.1, 3.2, 3.3 or SCOPE 3.4 (CDC6600), SCOPE 1.1.

TAC2D; Steady-State and Transient Temperature Calculations.
J. F. Petersen, S. S. Clark, and L. G. de Viedma.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-408 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048408 Price code: CP T14

TAC2D is designed to treat transient, two-dimensional heat transfer problems. Steady-state problems are treated by considering the problem to be a transient, starting with an assumed temperature distribution and running until equilibrium conditions are established. Geometrically, rectangular (x,y), cylindrical (r,z), or circular (r,theta) coordinates may be used. The grid line system must be orthogonal in the rectangular, cylindrical, or circular coordinate system. (ERA citation 08:021410)...Software Description: UNIVAC1108;IBM360,370,303x; FORTRAN V (UNIVAC1108), FORTRAN IV (IBM360); EXEC2 (UNIVAC1108), OS/360 (IBM360); 65K words are required on the UNIVAC1108 and 380K bytes on the IBM360. In addition to input/output, a maximum of four and a minimum of no tapes are required depending upon the code options being used.

LARCA; Flux-Weighting of DTF4 Cross Sections.
R. C. Anderson.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-409 U.S. Sales Only. Price includes documentation.

Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048409 Price code: CP T09

Multigroup cross sections are weighted by the flux in the appropriate groups and regions, and cross sections for the assembly are computed and punched in DTF4 format. The program also computes the infinite medium flux, reaction rates, and the infinite multiplication factor and material buckling. Maxima of 25 groups 13 reactions per group 20 zones 36 materials. (ERA citation 08:022486)...Software Description: CDC6600; FORTRAN IV; SCOPE; 63,000 (octal) storage.

TACASI; Analysis of Resonance Measurements.
S. Friesenhahn.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-410 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048410 Price code: CP T11

TACASI is used to determine the parameters of a single neutron resonance. The code accepts measured values of capture areas, self-indication areas, self-indication ratios and transmission areas and their associated uncertainties in any combination and determines best estimates of the neutron and radiation widths and their standard deviations. As many as 16 observed quantities may be input and as many as 24 subresonances may be included. (ERA citation 08:022487)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 65K memory.

M0661;M0657;M0626; Polynomial Curve Fitting.
T. Shimamoto.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-411R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048411 Price code: CP T11

M0661, M0657, and M0626 perform statistical analyses of data based on a least squares polynomial fit. (ERA citation 08:022829)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; CDC280 plotter for the graphical output.

MANE1; Rectangular Magnetic Network Solution.
D. A. Guerdan, and O. J. Marlowe.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-412R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048412 Price code: CP T09

The MANE1 program finds the magnetic flux in each branch of a magnetic network consisting of a number of branches of iron and air. The problem is one step in the design of slow speed reluctance motors in which the magnetic flux is determined in all component parts for a position of the rotor with respect to the stator. The network consists of a number of major rectangles of loops connected to each other in a cyclic fashion. (ERA citation 08:021327)...Software Description: CDC6600; FORTRAN IV; SCOPE 3; For small problems, lr = 18, 35,000 (octal) core locations are required. For large problems, lr = 80, 154,000 (octal) locations are required.

ALPHA-M; Resolution of gamma-Ray Spectra.
E. Schonfeld.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-413 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048413 Price code: CP T09

ALPHA-M is used for determining radioisotopes by least-squares resolution of the gamma ray spectra. It can handle a very large library of gamma ray spectra and takes into account corrections such as background subtraction, counting time, decay time, dead time, automatic compensation for gain and threshold shifts, size of the aliquot, volume reduction prior to counting, and so on. (ERA citation 08:022538)...Software Description: IBM360; FORTRAN IV.

TAC3D; Transient Three-Dimensional Heat Transfer Program.
J. F. Petersen.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-414 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048414 Price code: CP T09

TAC3D is designed to treat transient, three-dimensional heat transfer problems. Steady-state problems are treated by considering the problem to be a transient, starting with an assumed temperature distribution and running until equilibrium conditions are established. Geometrically, the problem may be defined by either rectangular (x,y,z) or cylindrical (r,z,theta) coordinates. The grid plane system must be orthogonal in the rectangular or cylindrical coordinate system. (ERA citation 08:021411)...Software Description: UNIVAC1108; FORTRAN V; EXEC2; 65K memory. A maximum of four and a minimum of no tapes are required, depending upon the code options being used.

CEXE;INCEXE; One-Group, Three-Dimensional Xyz Xenon Oscillation.
R. Kern, and S. Pacino.
Combustion Engineering, Inc., Windsor, CT. Computer Services Section. 1984, mag tape ANL/NESC-415 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048415 Price code: CP T09

CEXE solves the three-dimensional xyz time-dependent xenon spatial oscillation problem using a modified one energy group theory and a nodal representation. Maximum reactor core size representation is restricted to a nodal configuration of 19 x 19 x 10 in the x, y, z directions, respectively. (ERA citation 08:020520)...Software Description: IBM360; FORTRAN IV; OS/360; 256K bytes, 6 IBM2314 disk drives, and 3 IBM2400 tape drives.

PARTI; Optimal Group or Mesh Collapsing.
A. A. Harms, and J. A. Stoddard.
McMaster Univ., Hamilton, Ontario (Canada). Dept. of Engineering Physics. 1984, mag tape ANL/NESC-416 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048416 Price code: CP T03

PARTI is a group collapsing code which determines the optimum discrete representation of a variable for subsequent repetitive calculations. PARTI will optimize the discrete representation of an arbitrary function of one or two independent variables. (ERA citation 08:022488)...Software Description: CDC6500; FORTRAN IV; SCOPE; 32K memory.

ATHENA4; Inelastic Scattering Form Factors.
F. S. Chwieroth, J. J. Dodson, M. B. Johnson, L. W. Owen, and G. R. Satchler.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-417 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048417 Price code: CP T11

ATHENA4 computes form factors for inelastic scattering calculations, using single-particle wave functions that are eigenstates of motion in either a Woods-Saxon potential well or a harmonic oscillator well. Two-body forces of Gauss, Coulomb, Yukawa, and a sum of cut-off Yukawa radial dependences are available. Maxima of 100 wave function components 10 interaction components. The reduced matrix elements of the one-body multipole operators may be included automatically in the wave function coefficients. Non-local effects on the wave functions may be included in the local energy approximation. (ERA citation 08:022560)...Software Description: IBM360/75,91; FORTRAN IV; OS/360.

CHAINS; Analysis of Radioactive Decay Chains.
W. B. Henderson.
Westinghouse Electric Corp., Pittsburgh, PA. PWR Systems Div. 1984, mag tape ANL/NESC-418 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048418 Price code: CP T03

CHAINS computes the atom density of members of a single radioactive decay chain. The linearity of the Bateman equations allows tracing of interconnecting chains by manually accumulating results from separate calculations of single chains. Re-entrant loops can be treated as extensions of a single chain. Losses from the chain are also tallied. Maxima of 50 members in a chain 100 energy groups 100 time values. (ERA citation 08:022539)...Software Description: GE625,635; FORTRAN IV; GECOS; 16K memory.

GROUSE; Space-Dependent Cross Section Generation.
W. B. Henderson.
Westinghouse Electric Corp., Pittsburgh, PA. PWR Systems Div. 1984, mag tape ANL/NESC-420 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048420 Price code: CP T11

GROUSE computes effective multigroup cross sections as a function of position in the core of a reactor or the absorber region of a fuel or control element. The flux weighting uses synthesized fluxes generated in fine energy detail from parametric flux traverses supplied as input as a function of the core absorption and scatter cross sections. Maxima of 99 groups, 40 core zones, 20 parametric values of core absorption cross section, 3 parametric values of scattering cross section, 25 isotopes, 2600 fine energy lattice points. The core can contain a mixture of isotopes if the isotopic composition is not a function of position. (ERA citation 08:020521)...Software Description: GE625,635; FORTRAN IV; GECOS; 38K memory, 6 tapes or disk.

MICHRD; Microhardness Measurement Analysis.
N. R. Baumgardt.
General Electric Co., Cincinnati, OH. Aircraft Engine Group. 1984, mag tape ANL/NESC-421 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048421 Price code: CP T09

The Vickers pyramid number and the microhardness increment fraction are computed from filar micrometer eyepiece readings. These readings are made on indents, which have been made by an indenter, in the material being tested. Maxima of 100 temperatures for each specimen 1000 indents, summed over all temperatures, for each specimen 4 readings per indent. (ERA citation 08:021039)...Software Description: GE625,635; FORTRAN IV; GECOS; 27K memory.

DOS; Neutron Flux-Dosimeter Activity Relation.
W. B. Henderson, and N. R. Baumgardt.
Westinghouse Electric Corp., Pittsburgh, PA. PWR Systems Div. 1984, mag tape ANL/NESC-423 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048423 Price code: CP T03

DOS computes the local neutron flux per reference reactor power level which will produce the measured activity of a dosimeter. Alternatively, if the flux value is supplied, the corresponding dosimeter activity will be calculated. (ERA citation 08:020522)...Software Description: GE625,635; FORTRAN IV; GECOS III; 25K memory.

GLUB1; Water-Logged Fuel Element Analysis.
F. T. Dunckhorst, L. L. Lynn, W. A. Coffman, and J. E. Meyer.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-424R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048424 Price code: CP T11

GLUB1 solves the waterlogging transient caused by the existence of a fuel element cladding defect during an increase in power. The power is either - case 1, put in as an arbitrary function of time, or case 2, assumed to be a series of linear ramps to a new steady-state with steeper and steeper slopes. All the geometry and metal properties are input quantities. Water properties are obtained from internal tables. Clad and fuel thermal, stress, and strain computations are performed. The output consists of internal pressure and defect flow. For case 1, the clad stress versus time is printed, and for case 2 the steady-state power value which causes clad failure is printed. For each metal property, up to 10 values versus temperature can be put in. If power or defect enthalpy is to be input, up to 30 values versus time can be given. Finally, in order to obtain allowable power as a function of defect diam-

eter, up to 10 different diameters can be put in. (ERA citation 08:020604)...Software Description: CDC6600; FORTRAN IV; SCOPE; 60,000 octal locations.

REDUX; Reactor Fluctuation Experiment Analysis.
D. R. Harris, and M. Natelson.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-425R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048425 Price code: CP T03

REDUX is used for the reduction of data from reactor fluctuation experiments. From input count samples recorded by one or two counting channels, the program computes unbiased sample estimates of moments and functions of moments of the count distributions, including the dispersion parameter y and the modified coefficient of correlation MCC. Standard error estimates are computed for y and MCC. (ERA citation 08:020523)...Software Description: CDC6600; FORTRAN IV; SCOPE; 64,000 (octal) locations.

PAX03; Harmony-PDQ Cross Section Generation Code.
S. M. Nikolich, S. H. Weiss, O. J. Marlowe, B. O. Greenberg, and S. E. Kovscek.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-426R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048426 Price code: CP T17

PAX03 performs infinite medium, time-dependent calculations of neutron flux spectra in homogeneous, hydrogenous media. A HARMONY file containing few-group microscopic and/or macroscopic cross sections for PDQ7 problems may be generated. The one-dimensional multigroup transport equation may be solved using a P1 to P7 approximation in rectangular, cylindrical, or spherical geometry. Heterogeneous resonance integrals and thermal shielding factors are calculated for either plate or rod geometry. Blackness parameters are calculated and coefficients for temperature feedback calculations are obtained. Few-group constants are available in both the fast and thermal energy ranges. Maxima of 30 cells calculated in one problem 30 nuclides represented in the fast energy spectrum 50 nuclides used in other parts of the program 4 fast groups with 1 thermal group or 3 fast groups with 2 overlapping thermal groups 3 perturbed parameters in the temperature feedback calculations unlimited number of depletion times. (ERA citation 08:022489)...Software Description: CDC6600; FORTRAN IV and COMPASS; SCOPE 3; System disk, dedicated disk area for Bettis file manager, extended core storage (ECS) for auxiliary storage.

FARED; One-Dimensional Fast Reactor Design and Survey Study.
D. H. Roy, J. M. Tilford, A. Z. Livolsi, P. N. Colpo, and C. D. Carmichael.
Babcock and Wilcox Co., Lynchburg, VA. Nuclear Power Generation Dept. 1984, mag tape ANL/NESC-427 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048427 Price code: CP T17

FARED contains an internal cross section averaging routine which is responsible for preparing broad group cross section sets for various material regions of the reactor. The cross section averaging is performed in program REGA, which computes a B1 flux and current in up to 20 reactor block compositions for use as weighting functions in the cross section collapsing calculation. A homogeneous or heterogeneous resolved and unresolved resonance treatment is provided to compute effective microgroup resonance cross sections for the block mixture or up to 2 cell types per block. Real and adjoint flux distributions are calculated for one-dimensional slab, cylindrical, or spherical geometries. The real fluxes are normalized to yield desired total reactor power. Criticality searches may be performed on the reactor dimension, transverse buckling or zone compositions. Enrichment searches may be performed to yield desired ratios of maximum (or average) power densities in several zones. Zonewise depletion is calculated either for a given time period or until specified criticality, burnup or nuclide concentrations are satisfied. Flexible fuel management is available permitting specified material units to be moved into, out of or shuffled within the reactor. A wide variety of edits may be performed, including perturbation and kinetic parameters calculations. Maxima of 100 microgroups, 30 multigroups, 15 downscattering groups, 150 mesh points, 149 mesh intervals, 149 mesh intervals per zone, 50 unique nuclides, 20 zones, 20 blocks, 100 zone materials, 40 cells, 30 nuclides per block, 20 zones per block, 2 cells per block, 30 nuclides in a chain, 500 resonance peaks per nuclide, 15 nuclides per cell composition, 30 nuclides per block composition, 7 resonance nuclides per block, 3000 storage locations for bulk material data. (ERA citation 08:020524)...Software Description: CDC6600; FORTRAN IV and COMPASS; SCOPE 3; 45,000 (decimal) core storage and 16 tape drives or distinct disk files plus I/O.

DOGGY; Desk Calculator Form Sheet DP Package.
S. A. Gazda.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-428R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048428 Price code: CP T11

DOGGY can perform most routine form sheet calculations. The program can handle common arithmetic manipulations on columns of input such as addition, subtraction, multiplication, and division. It also has provisions for the use of special functions such as logarithmic, trigonometric, arc trigonometric, hyperbolic, exponential, square root, maxima, minima, and raising a number to any power. DOGGY also calculates water properties such as thermal conductivity, viscosity, and Prandtl Number over a wide range of temperature and pressure. Maxima of 150 columns of input 100 rows per column. (ERA citation 08:022830)...Software Description: CDC6600; FORTRAN IV and ASCENT.

ASPIS; Gamma-Ray Source Buildup Factor Calculations.
L. Lois.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-429R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048429 Price code: CP T11

ASPIS computes the energy, dose and energy deposition buildup factors for monoenergetic gamma rays for a plane isotropic, plane monodirectional, or plane slant source, in an arbitrary laminar array. Maxima of 12 regions 151 spatial

mesh points per region 650 total spatial mesh points 10 material compositions 10 MeV maximum energy 251 total energy mesh points 13 energy groups 6 terms in the double range Legendre polynomial expansion of the flux 6 terms in the Legendre polynomial expansion of the scattering kernel. (ERA citation 08:022490)...Software Description: CDC6600; FORTRAN IV and ASCENT; SCOPE 3.1; 140K (octal) memory and 3 tapes for scratch storage.

GAZE2; One-Dimensional Multigroup Diffusion in Slab, Spherical, and Cylindrical Geometries.
S. R. Lenihan.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-430 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048430 Price code: CP T12

GAZE2 is a one-dimensional, multigroup, neutron diffusion theory program. It includes all four of the standard one-dimensional geometries - slab, sphere, radial cylinder, and axial cylinder, the last of which is identical to slab geometry except when the ZOOM albedo-type transverse boundary condition is used. (ERA citation 08:022491)...Software Description: UNIVAC1108; FORTRAN IV (95%) and Assembly language (5%); EXEC2.

SUPERTOG; ENDF/B Fine-Group Constants Generation.
R. Q. Wright, J. L. Lucius, N. M. Greene, and C. W. Craven, Jr.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-431 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048431 Price code: CP T14

SUPERTOG accepts nuclear data in either a point by point or parametric representation as specified by ENDF/B. This data is averaged over each specified group width. The explicit assumption is made that the flux per unit lethargy is constant or that a suitable weight function will be supplied by the user. When resonance data is available, resolved and unresolved resonance contributions are calculated and used as specified by input options. Fine group constants such as one-dimensional reaction arrays (absorption, fission, etc.), PN elastic scattering matrices, and inelastic and (n,2n) scattering matrices are generated and placed on tapes in formats suitable for use by the GAM1, GAM2, ANISN, or DOT programs. (ERA citation 08:022492)...Software Description: IBM360; FORTRAN IV (ANSI FORTRAN); OS/360; 65K memory, 6 scratch disks, and 1 tape.

COBRA4I; Rod Bundle and Core Thermal-Hydraulics.
C. L. Wheeler, C. W. Stewart, J. F. Cena, D. S. Rowe, and A. M. Sutey.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-432 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048432 Price code: CP T13

COBRA41 performs steady-state and transient thermal-hydraulic analysis of rod bundle nuclear fuel elements and cores via the subchannel analysis method. Using the COBRA4I code option to store variables on peripheral storage devices eliminates any practical limit as to maximum problem size. However, computer core requirements and code execution time is always a consideration when determining the complexity of the problem to be solved. (ERA citation 08:020605)...Software Description: CDC6600,7600,CYBER175;CRAY1; FORTRAN IV; SCOPE (CDC6600,7600), NOS (CDC CYBER175), COS (CRAY1); 202,000 (octal) words and 4 scratch units besides the standard input/output units.

CONTEMPT-LT/028;CONTEMPT-LT/026; Pressure-Temperature Response.
D. W. Hargroves, L. J. Metcalfe, T. Cheng, L. L. Wheat, and W. J. Mings.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-433 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048433 Price code: CP T99

CONTEMPT-LT was developed to predict the long-term behavior of water-cooled nuclear reactor containment systems subjected to postulated loss-of-coolant accident (LOCA) conditions. CONTEMPT-LT calculates the time variation of compartment pressures, temperatures, mass and energy inventories, heat structure temperature distributions, and energy exchange with adjacent compartments. The program is capable of describing the effects of leakage on containment response. Models are provided for fan cooler and cooling spray engineered safety systems. One to four compartments can be modeled, and any compartment except the reactor system may have both a liquid pool region and an air-vapor atmosphere region above the pool. Each region is assumed to have a uniform temperature, but the temperatures of the two regions may be different. The user determines the compartments to be used, specifies input mass and energy additions, defines heat structure and leakage systems, and prescribes the time advancement and output control. Maxima of 20 heat conducting structures 101 mesh points for each structure 20 regions for each structure 50 flow elements in one segment of the horizontal vent pressure suppression system 10 horizontal vents (or branches) in a segment 50 reductions within an input time-step. CONTEMPT-LT can be used for analyzing the transient containment behavior of boiling-water reactors (BWRs) including Mark I, Mark II, and Mark III systems; pressurized-water reactors (PWRs), and experimental water reactor simulators or related experiments. (ERA citation 08:020569)...Software Description: CDC7600,CYBER176;IBM360; FORTRAN IV and COMPASS (CDC7600). FORTRAN IV and BAL (IBM360); SCOPE 2.1 (CDC7600), OS/MVT (IBM360); 58K (octal) bytes and a CalComp or microfilm plotter (CONTEMPT-LT/028); 430K bytes and a CalComp or SC4060 plotter for graphical output (CONTEMPT-LT/026).

HEATMESH; Geometrical Data Heat Transfer Study.
V. K. Gabrielson.
Sandia National Labs., Livermore, CA. 1984, mag tape ANL/NESC-434 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048434 Price code: CP T09

HEATMESH is used to generate geometrical data required for studies of heat transfer in axisymmetric structures represented as surfaces of revolution. The program consists of two dis-

tinct phases. The first subdivides the given parts into a nodal network and evaluates the geometrical properties of the nodes. The second determines adjacent nodes and edits geometrical data for the thermal model. (ERA citation 08:021328)...Software Description: CDC6600; FORTRAN IV; SCOPE.

BURST1; Hydrodynamic Analysis During Blowdown.
G. A. Jayne, G. H. Hanson, and R. P. Rose.
Idaho Nuclear Corp., Idaho Falls. 1984, mag tape ANL/NESC-435 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048435 Price code: CP T13

BURST1 provides for the study of pressurized liquid in a cylindrical system immediately after a rupture occurs at one or both ends of the system. Pressure, mass velocity, and enthalpy are calculated at equally-spaced mesh points along the length of the system. This is a one-dimensional representation, assuming uniform conditions throughout any given cross-sectional area. Forces on designated sections of the system can also be computed, with provision for directional changes. Maxima of 50 total cylinders and adapters 2000 space-steps in the whole system 5000 time-steps. Only subcooled, frictionless, adiabatic cases can be considered. (ERA citation 08:021412)...Software Description: IBM360/75; FORTRAN IV; OS/360; 32K memory.

ETOM1; ENDF/B Format to MUFT Format Cross Sections.
R. A. Dannels, and D. E. Kusner.
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Energy Systems Div. 1984, mag tape ANL/NESC-436 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048436 Price code: CP T13

ETOM1 processes basic nuclear information given in the ENDF/B format and produces data decks for use in generation of MUFT4 and MUFT5 libraries. (ERA citation 08:022493)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 43,000 (decimal) locations with 2 tapes (scratch tape and library tape).

ETOG1; ENDF/B to MUFT, GAM, ANISN Cross Sections Format.
D. E. Kusner, R. A. Dannels, and S. Kellman.
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Energy Systems Div. 1984, mag tape ANL/NESC-437 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048437 Price code: CP T14

ETOG1 processes basic nuclear information given in the ENDF/B format and produces data decks for use in generation of MUFT4, MUFT5, GAM1, GAM2, and ANISN libraries. (ERA citation 08:022494)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 55,000 decimal locations and 4 scratch tapes in addition to the library tape and standard input, output, and punch units.

BUG2; Two-Dimensional Multigroup Diffusion and Burnup In Xy, Rz Geometries.
J. P. Dorsey, R. Froehlich, and F. Todt.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-438 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048438 Price code: CP T15

The two-dimensional, multigroup, neutron diffusion equations for x-y or r-z geometry are solved to obtain the multiplication factor and the spatial flux and power distributions. Complete reactor life histories with partial refueling at a number of reload points can be calculated. The depletion scheme of all burnable nuclides is specified by the user at execution time. A regionwide depletion scheme is used. Concentration dependent self-shielding factors may be applied to any nuclide. Maxima of 10 groups 20,000 space mesh points 255 regions 300 subregions 40 total nuclides 25 heavy nuclides 25 fission products and other burnable nuclides. (ERA citation 08:022495)...Software Description: UNIVAC1108; FORTRAN IV and Assembly language; EXEC2, GAX23; 65,536 words of core storage, 2 million words of drum storage on one data channel, 3 tape units, and a peripheral printer.

BUGTRI; Two-Dimensional Multigroup Diffusion and Burnup in Triangular Geometries.
J. P. Dorsey, R. Froehlich, and F. Todt.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-439 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048439 Price code: CP T15

The 2-dimensional multigroup, neutron diffusion theory equations for triangular geometry are solved to obtain the multiplication factor and the spatial flux and power distributions. Complete reactor life histories with partial refueling at a number of reload time-points can be calculated. The depletion scheme of all burnable nuclides is specified by the user at execution time. A regionwise depletion scheme is used. Concentration dependent self-shielding factors may be applied to any nuclide. Maxima of 10 groups 20,000 space mesh points 255 regions 300 subregions 40 total nuclides 25 heavy nuclides 25 fission products and other burnable nuclides. (ERA citation 08:022496)...Software Description: UNIVAC1108; FORTRAN IV and Assembly language; EXEC2, GAX23, 65,536 words of core storage, 2 million words of drum storage on one data channel, 3 tape units, and a peripheral printer.

DYNAM; Dynamic Analysis Boiling Flow Steam.
G. Schlueter, and L. E. Efferding.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-440 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048440 Price code: CP T11

DYNAM performs a dynamic analysis of once-through boiling flow oscillations with steam superheat. The model describing the superheat regime (single-phase, variable density fluid) for subcritical pressure operation is also applicable to the study of once-through operation using supercritical pressure water. Maxima of 30 intervals used to describe the power distribution in the nonboiling and boiling regions 29 boiling nodes 7 intervals and corresponding friction multipliers read in per case 14

exit qualities read in per case 40 superheat nodes 10 coefficients read in for the phi**2 vs, x-polynomial fit 48 frequencies at which open-loop frequency response is desired 48 frequencies at which signal output is desired. (ERA citation 08:021413)...Software Description: UNIVAC1108; FORTRAN; EXEC2.

PWCOST; Reactor Fuel Cycle Cost Calculation.
D. H. Lee.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-441 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048441 Price code: CP T11

PWCOST is used to calculate nuclear reactor fuel cycle costs. Input for all components of the fuel cycle are time-dependent. Working capital charge rates may be specified separately for in-core and out-of-core time periods. Maxima of 24 core regions, 100 segments, 2 fuel particle types, 100 reloads before equilibrium is established, 100 times for core reload. (ERA citation 08:020473)...Software Description: UNIVAC1108; FORTRAN IV; EXEC2; 65K core and 1 tape.

SIMPLE1; Time-Sharing Programming Language.
M. F. Barrett.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-442R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048442 Price code: CP T09

SIMPLE1 compiles and executes multistatement calculations typed in a familiar algebraic notation at a time-shared terminal, immediately returning requested results to the terminal and permitting ad lib continuation of a calculation. The user may use the system as an extended and powerful electronic calculator, or as a calculator of small load-and-go runs. Errors are detected and corrected on an as-you-go basis. Calculations may include interactive input/output, functions, and loops. (ERA citation 08:022831)...Software Description: CDC6600; FORTRAN IV and ASCENT; SCOPE.

HAA3B; Aerosol Behavior Lognormal Model.
J. Otter, E. U. Vaughan, L. Baurmash, and R. Koontz.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-443 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048443 Price code: CP T11

HAA3B was written to provide an engineering method for calculating heterogeneous aerosol behavior and transport following various hypothetical LMFBR accidents. HAA3B evaluates an approximation to the general integro-differential equation which describes aerosol behavior. The physical model includes particle generation, Brownian and gravitational agglomeration, settling, plating, and leakage for spherical particles. The approximation is the requirement that the size distribution function be lognormal. Maxima of 1000 time-steps in lognormal model part 42 discrete radii for leakage distribution calculations 50 leak-rate input values 50 source-rate input values. Applicability has been verified for moderate concentrations in moderate-sized vessels, and for limited types of sources, only. (ERA citation 08:020653...Software Description: IBM370; FORTRAN IV (H); OS/370 Release 21.6; A logical unit 5 for input, unit 6 for output, unit 16 for a scratch unit, and a card punch. SC-4020 CRT coding is included as comment cards. Storage allocation is less than 150K bytes.

ROPE; Finding Roots of a Polynomial.
N. R. Mitchell.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-444R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048444 Price code: CP T09

ROPE is used to calculate roots of polynomials. ROPE can find roots of polynomials of order up to 99. (ERA citation 08:022832)...Software Description: CDC6600; FORTRAN IV.

LIZARD4; Nonlinear Differential Equations Solution.
D. R. Dolk.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-445R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048445 Price code: CP T11

LIZARD4 is used to solve nonlinear, ordinary differential equations as a one-shot effort. It was written to solve initial value equations, that is, the values of the dependent variables must be specified at some initial value of the independent variable. One-dimensional steady-state boundary value problems can be solved with LIZARD4, providing an iterative method is employed by the user where one of the boundary conditions is specified and integration proceeds until the alternate boundary condition is met. Maximum of 25 nonlinear first-order differential equations. (ERA citation 08:022833)...Software Description: CDC6600; FORTRAN IV and ASCENT.

MOST; A Multidimensional Optimization Scheme.
C. R. Lubitz, and G. A. Shanholt.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-446R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048446 Price code: CP T03

MOST is designed to vary a set of coordinates (x1,x2, . . . ,xn) representing the vector x in such a way that a specified function y(x), y(x) greater than or equal to 0, is minimized. The maximum dimension of the search is 20. (ERA citation 08:022834)...Software Description: CDC6600; FORTRAN IV.

ETOG1 Data for MUFT and GAM Libraries; MUFT4 or 5, GAM1 or 2.
S. Kellman, and D. E. Kusner.
Westinghouse Electric Corp., Pittsburgh, PA. PWR Systems Div. 1984, mag tape ANL/NESC-447 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048447 Price code: CP T16

The data required for the creation of MUFT4, MUFT5, GAM1, and GAM2 libraries were generated from the Brookhaven Na-

tional Nuclear Data Center ENDF/B tapes 114 through 117 by the ETOG1 program. Library No. of groups GAM1 68 GAM2 99 MUFT4,5 54 A 1/E weighting function joined to the fission spectrum was used. A 1.0*10**7 value was used as the non-resonance potential scattering cross section per absorber atom. For MUFT libraries the 26th group was the lowest group number in the resonance region, the 25th group was the highest in the inelastic region. (ERA citation 08:022341)...Software Description: CDC6600.

FLASH6;FLASH4; Fully-Implicit Transient Simulation.
J. J. Beyer, W. D. Peterson, D. A. Prelewicz, G. W. Swartele, and C. K. Herkstroeter.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-448R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048448 Price code: CP T15

FLASH6 and earlier FLASH programs are used to determine the transient response of a water-cooled reactor or hydraulic system to severe variable pressure operation. As with previous editions, FLASH6 permits the user to model the reactor plant using a flexible combination of control volumes (nodes), connecting flow paths, pumps, and steam generators. A detailed representation of the core region may be obtained by using up to 80 pressure-determining nodes within the core. The core nodes are connected in one-dimensional chains to represent up to 20 core flow paths. A one-dimensional heat conduction model with up to five radial nodes is used to represent the flow of heat from the fuel element to each core fluid node. Thermal resistance of the fuel-clad gap is continuously calculated during the transient as a function of varying gap dimension, temperature, and pressure. Thirty nodes and 60 flow paths are available to model the non-core regions of the plant. In FLASH6 (FLASH 4) up to 30 (20) pressure-determining nodes and 60 flow paths are available. The plant and core geometry are assumed fixed in time, hence the solution is not applicable after significant dimensional change. (ERA citation 08:020654)...Software Description: IBM360,370;CDC6600,7600; FORTRAN IV; OS/360,370 (IBM360,370), SCOPE 3.3 (CDC6600), SCOPE 1.1 (CDC7600); 250 bytes (IBM360), 144K central memory and 200K ECS or LCM memory (CDC6600 or 7600).

CYGRO3; Oxide Fuel Rod Stress and Deformation.
E. Duncombe, C. M. Friedrich, R. N. Hagen, D. C. Bell, and T. R. Walker.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-449R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048449 Price code: CP T15

CYGRO3 is an extensive modification of CYGRO1 and CYGRO2. Basically the program calculates temperatures, deformation, and stresses in cladded fuel rods as a function of a history of power and coolant conditions. Axial and circumferential uniformity are assumed. Bubble growth and migration are included. The main changes from CYGRO1 and CYGRO2 are in the area of void migration, fuel cracking, clad collapse, representation of in-pile creep and clad anisotropy. Maximum of 30 rings (fuel plus clad). (ERA citation 08:020606)...Software Description: CDC6600;IBM360,370; FORTRAN IV (CDC6600), FORTRAN IV and Assembly language (IBM360); SCOPE (CDC6600), OS/360,370 (IBM360,370); 140,000 (octal) words.

KENO2;KENO4; Monte Carlo Multigroup Criticality Code.
D. Dickinson, H. K. Clark, L. M. Petrie, and N. F. Cross.
Dow Chemical Co., Golden, CO. Rocky Flats Div. 1984, mag tape ANL/NESC-450 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048450 Price code: CP T17

KENO is a multigroup, Monte Carlo criticality code containing a special geometry package which allows easy description of systems composed of cylinders, spheres, and cuboids (rectangular parallelepipeds) arranged in any order with only one restriction. Each geometrical region must be described as completely enclosing all regions interior to it. For systems not describable using this special geometry package, the program can use the generalized geometry package (GEOM) developed for the O5R Monte Carlo code. It allows any system that can be described by a collection of planes and/or quadratic surfaces, arbitrarily oriented and intersecting in arbitrary fashion. Rectangular arrays of fissile units are allowed with or without external reflector regions. Output from KENO consists of keff for the system plus an estimate of its standard deviation and the leakage, absorption, and fissions for each energy group plus the totals for all groups. Flux as a function of energy group and region and fission densities as a function of region are optional output. KENO4 is flexibly dimensioned so that the allowed size of a problem is limited only by the total data storage available. A method for determining the size of a problem is included in reference 8. (ERA citation 08:021329)...Software Description: IBM360;CDC6600; FORTRAN IV and Assembly language (IBM360), FTN FORTRAN with COMPASS subroutine (CDC6600); OS/360 (IBM360) and SCOPE 3.3 (CDC6600); The CDC6600 program requires 64K words of fast core, a disk facility or one or more tape units. The IBM360 version of KENO2 requires approximately 64K words of fast core, a disk facility or one or more tape units. The IBM360 version of KENO4 requires 1 to 6 ratch units besides the standard input/output units and a minimum of about 200K core.

SAFE-CRACK; Viscoelastic Analysis of Concrete.
Y. R. Rashid.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-451 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048451 Price code: CP T11

SAFE-CRACK performs a visco-elastic analysis of plane and axisymmetric composite concrete structures subjected to transient temperature and mechanical loadings. The specific creep of concrete as an age and temperature-dependent function, and concrete failure under combined stresses are considered. Particular emphasis is placed on the cracking analysis in concrete structures and the nonlinear dependence of creep property on transient temperature. Maxima of 300 nodes 675 elements 70 time-steps. (ERA citation 08:021434)...Software Description: UNIVAC1108; FORTRAN V; EXEC2; 65K memory and 13 tapes.

SHELL5; Thin Shell Three-Dimensional Structural Analysis.

N. Prince.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-452 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048452 Price code: CP T11

SHELL5 performs an elastic stress analysis of smoothly curved, arbitrarily shaped, three-dimensional thin shells with any desired distributions of material properties, boundary constraints, and mechanical, thermal, and displacement loading conditions. Maxima of 1000 nodal points 2000 elements. The maximum difference allowed for coupled nodal point indexes is 23. (ERA citation 08:021435)...Software Description: UNIVAC1108; FORTRAN V; EXEC2; 65K memory, 5 tapes, 3.5 million word drum area.

RICE; Primary Recoil Atom Spectra ENDF/B Data.
J. D. Jenkins.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-453 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048453 Price code: CP T11

The program calculates an energy exchange matrix which describes the probability that a neutron with energy E will produce a recoil atom with energy T in a given material. In addition, the program can calculate the primary recoil atom energy spectrum for a given neutron spectrum, the damage cross section for the material, and an optimum lower energy limit for use in comparing the relative damage in different reactor spectra. The program accepts neutron scattering data directly from the ENDF/B library tapes and, in the case of a resonance nuclide, from a tape generated by the program SUPERTOG. RICE does not recognize all of the multiplicity of data formats allowed by ENDF/B. It is programmed to accept the most prevalent formats. In addition, the neutron energy distribution is restricted to a 99-group representation and the recoil energies are represented by 200 energy groups. (ERA citation 08:022497)...Software Description: IBM360; FORTRAN IV; OS/360; 110,000 words of core storage and five I/O devices other than normal input/output.

PHENIX; Two-Dimensional Diffusion Burnup Refueling History.
T. J. Hirons, and R. D. O'Dell.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-454 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048454 Price code: CP T11

PHENIX is a two-dimensional, multigroup, diffusion-burnup-refueling code for use with fast reactors. The code is designed primarily for fuel-cycle analysis of fast reactors and can be used to calculate the detailed burnup and refueling history of fast breeder reactor concepts having any generalized fractional batch reloading scheme. Either ordinary keff calculations or searches on material concentration or region dimensions can be performed at any time during the burnup history. The complete fuel cycle history can be calculated in one run, or the individual burnup intervals can be treated separately. The refueling option of the code accounts for the spatial flux shifts over the reactor lifetime in the calculation of fuel discharge. Maximum of 50 energy groups. Variable dimensioning is used with nearly all subscripted variables stored in a single 27,000 word array. (ERA citation 08:020408)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.2; 65K memory, 1 random-access storage device (disk), and 2 magnetic tape units. If cross sections are input from cards, only one tape unit is required. The other tape unit is used for flux guesses or dumps (if desired), and to store burnup data needed for the refueling portion of the program.

DAC1; SN Perturbation Code Using DTF4 Fluxes.
B. M. Carmichael.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-455 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048455 Price code: CP T09

DAC1 uses angular fluxes from the DTF4 SN code to calculate reactivity perturbations, effective delayed neutron fractions, and generation times in reactors. The reference reactor specifications are input to DAC1 by a direct reading of the DTF4 input deck. Consequently, the only additional input needed are the perturbation specifications. The FORTRAN IV programming techniques such as variable dimensioning used in DTF4 are retained in DAC1. Consequently, any combination of problem parameters may be used which will fit in the over-all available storage. Generally, the problems that fit for DTF4 can also be accommodated by DAC1. (ERA citation 08:020525)...Software Description: CDC6600; FORTRAN IV; SCOPE 3; 2 disk or tape files are required if angular fluxes are used.

DBUFIT1; Least Squares Transmutation Analysis.
R. P. Matsen.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-456 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048456 Price code: CP T11

DBUFIT1 is designed to extract integral cross section information from isotopic burnup data. This information is obtained by fitting burnup equations to the isotopic data using least-squares fitting techniques. Burnup equations for the following transmutation chains have been programmed - Pu239 to Pu242, U238 to Pu242, Pu242 to Cm244 and U235 to Pu238. The data from as many as 150 samples may be analyzed at one time. (ERA citation 08:020526)...Software Description: UNIVAC 1108; FORTRAN V; CSCX Operating System; Core memory requirements are 40,000 (octal) locations for instructions and almost 50,000 (octal) locations for data storage. A CalComp plotter is necessary if plotted results are desired.

GSSLRN1B; Least Squares Photopeak Spectra Code.
G. D. Seybold.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-457 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048457 Price code: CP T11

GSSLRN1B is utilized for evaluations and statistical determination of photopeaks in photon spectra. The code performs evaluations of photopeak spectra using as input the digitized,

pulse-height distribution which is output from a large multichannel analyzer. Photopeaks are located, functions fit to each real peak, and the relative intensity of each fitted peak above the background continuum is calculated. The code is easily adaptable for analysis of any spectra which can be adequately defined by peaks represented in analytic form. Maxima of 2048 channels from a multichannel analyzer per case, 200 fitted peaks per case, 250 channels per interval of fit, 10 peaks per interval of fit, 49 parameters per interval of fit. These limits are based upon analysis of photopeaks described by symmetric Gaussian analytical form. (ERA citation 08:020527)...Software Description: UNIVAC1108; FORTRAN V with Assembler language used for two minor routines; CSCX Operating System; 65K core, 131,000 (octal) locations of scratch drum, two tapes, CalComp 763 plotter for plotting options.

VELVET2; Turbulent Flow in LMFBR Rod Bundle.
D. J. Bender, and P. M. Magee.
General Electric Co., Sunnyvale, CA. Breeder Reactor Development Operation. 1984, mag tape ANL/NESC-458 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048458 Price code: CP T11

VELVET2 solves the coupled, heat-transfer equations in the fuel, gap, cladding, and coolant for a triangular-spaced, close-packed, fuel rod bundle with liquid metal coolant. The model includes temperature-dependent material properties, turbulent velocity distribution in the coolant, and contributions to coolant heat transfer by turbulent mixing. Maxima of 10 radial divisions in the fuel, 5 radial divisions in the clad, 10 radial divisions in the coolant between the outer edge of the buffer layer and one-half the pitch, 10 circumferential divisions. (ERA citation 08:020409)...Software Description: GE635; FORTRAN IV; GECOS: 32K memory.

DOT2DB; Two-Dimensional Multigroup Diffusion and SN Theory.
R. Protsik, and E. G. Leff.
General Electric Co., Sunnyvale, CA. Breeder Reactor Development Operation. 1984, mag tape ANL/NESC-459 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048459 Price code: CP T12

DOT2DB solves both the multigroup, discrete ordinates transport theory and the multigroup, diffusion theory equations in two dimensions. Anisotropic scattering of any order Legendre expansion is allowed in the transport theory option. Anisotropic scattering in the diffusion theory option is treated with the transport approximation, using the P1 scattering matrix, when provided, to calculate the transport cross section. Options include solutions in (x,y), (r,z), (r,theta), and, in the diffusion theory option, triangular geometries. Both direct and adjoint fluxes may be computed for fixed volume-distributed source, multiplication-constant iteration, time-absorption iteration, concentration search, zone-thickness search, and fixed-boundary source problems. In addition to the fixed-boundary source problem, options include vacuum, reflection, periodic and white boundary conditions. Cross sections may be entered from cards or from tape in the DTF format. Activities for any material in the system may be output by interval (optional) and zone. Other output includes the interval fluxes and sources and a reaction summary table for each zone and for the system. (ERA citation 08:022498)...Software Description: GE635; FORTRAN IV; GECOS-III; 45K memory, 3 to 8 scratch files and a cross-section library file.

LIFE3; Mixed-Oxide Fuel Element Performance.
M. C. Billone, V. Z. Jankus, and R. B. Poeppel.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-460R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048460 Price code: CP T12

The LIFE3 computer code was developed to calculate the thermal and mechanical response of mixed-oxide fuel elements in a fast-reactor environment. It incorporates a one-dimensional, steady-state heat-transfer analysis and a finite-strain-theory structural analysis based on generalized plane strain and the method of successive elastic solutions. An incremental approach is used so that temperatures, stresses, and strains can be calculated during any specified history of reactor power cycling. Fuel-cladding and sodium-cladding chemical attack is treated by a cladding wastage model. Up to six axial sections are allowed to account for axial variations in power and coolant temperature. Fuel restructuring; migration of fabricated and swelling porosities; fuel and cladding thermal expansion, elasticity, swelling, and creep; fission-gas release; and fuel cracking, crack healing, and hot pressing are included in the analysis. LIFE3 is the reference ERDA code for calculating the performance of fast breeder reactor fuel elements under normal operating conditions, including power cycling. (ERA citation 08:020607)...Software Description: IBM370;CDC7600; FORTRAN IV; OS/370 (IBM370), SCOPE 2.1 (CDC7600); 325K bytes of memory (IBM370/195) and 125,000 (octal) words (CDC7600) with one scratch file and one file for restart information, in addition to the system input and output units.

EPOCH; Neutron Age Calculation of ENDF/B Data.
J. D. Batler, E. M. Gelbard, and E. Schmidt.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-461R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048461 Price code: CP T11

EPOCH solves for fine detail P1 flux spectra in simply-buckled media and is able to calculate neutron ages from the spectra. It obtains nuclear cross sections from the ENDF/B library, ignoring resonance files, and is most useful for higher energies where resonant reactions are weak or absent. The present version reads only ENDF/B Version 1 tapes. The maximum number of groups is 2000 and the maximum number of ENDF/B materials is 10 (or 5 in age calculations). The number of center-of-mass elastic scattering moments read from ENDF/B must be less than 7. The resonant cross sections for any material are ignored. (ERA citation 08:020321)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 140K (octal) memory and 1720K (octal) extended core storage. The amount of extended core storage can be readily reduced for most problems.

SPAN4; a Point-Kernel Shield Evaluation Code.
O. J. Wallace.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-462R U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048462 Price code: CP T15

SPAN4 calculates the fast neutron dose rate, thermal neutron flux, gamma-ray flux, dose rate, and energy-absorption rate in rectangular, cylindrical, and spherical geometries by integrating appropriate exponential kernels over a source distribution. The shield configuration is flexible--a first-level shield mesh, using any one of the three geometries, is specified. Regions of this same geometry or of other geometries, having their own (finer) meshes, may then be embedded between the first-level mesh lines, defining second-level shield meshes. This process is telescopic--third-level shield meshes may be embedded between second-level meshlines in turn. All meshes may have variable spacing. Sources and detectors may be located arbitrarily with respect to any shield mesh. The source is defined by the function: s= s0+ s1(a)*s2(b)*s3(c)+ s4(a,b)*s3(c)+ s5(a,c)*s2(b)+ s6(b,c) *s1(a)+ s7(a,b,c) where a, b, and c represent coordinates. If any factor is missing, the corresponding terms are zero. Cross sections, buildup factors, standard compositions, energy structures, dose-conversion factors, infinite line and infinite plane source kernels, and quadratures are contained in a library of approximately 10,000 items. (ERA citation 08:022499)...Software Description: CDC6600; FORTRAN IV and ASCENT; SCOPE 3.1; 64K central memory and one system disk. Microfilm is required if the plot options are to be used.

3DDT; Three-Dimensional Multigroup Diffusion Xyz or R-theta-Z.
J. C. Vigil.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-463 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048463 Price code: CP T12

3DDT is a three-dimensional (x-y-z or r-theta-z) multigroup, diffusion theory code for use in fast-reactor analysis. The code can be used to compute keff or to perform criticality searches on reactor composition, time absorption, and reactor dimensions by either the regular or the adjoint flux equations. Material burnup and fission-product buildup can be computed for specified time intervals, and criticality searches can be performed during burnup to compensate for fuel depletion and fission product growth. (ERA citation 08:020528)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.2; CDC6600 computer with 65K words central memory, 500K ECS, 6,000K disk (four tape files are simulated on the disk), two magnetic tape units, and the usual input/output devices.

DYNO1; Photomultiplier Electron Distribution.
J. E. Edwards, J. F. McCarthy, and P. A. Henline.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-464R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048464 Price code: CP T03

DYNO1 calculates the distribution of electrons that are emitted from a photomultiplier composed of a series of dynodes. Maxima of 4 stages 10,000 electrons for which probabilities will be calculatd. (ERA citation 08:021624)...Software Description: CDC6600; IBM360; FORTRAN IV: SCOPE (CDC6600) and OS/360 (IBM360); About 45,000 words of memory.

RESEND;ADLER; ENDF/B Resonance Cross Section Codes.
M. R. Bhat, and O. Ozer.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-465 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048465 Price code: CP T11

RESEND generates infinitely-dilute, unbroadened, point cross sections in the ENDF format by combining ENDF File 3 background cross sections with points calculated from ENDF File 2 resonance parameter data. ADLER calculates total, capture, and fission cross sections from the corresponding Adler-Adler parameters in the ENDF/B File 2 Version II data and also Doppler-broadens cross sections. (ERA citation 08:020529)...Software Description: CDC6600; PDP10; FORTRAN IV; SCOPE 3.0; RESEND requires 24K (decimal) core with 2 scratch units, an input unit for the ENDF data, an output unit, a unit for reading in the run parameters (teletype or system input) and a unit for printing run-associated messages (teletype or system output). ADLER requires 37K (octal) memory.

APRFX1; 99-Group DLC-2B Library Group-Collapsing.
P. S. Pickard, and A. H. Kazi.
Army Pulse Radiation Facility, Aberdeen Proving Ground, MD. 1984, mag tape ANL/NESC-466 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048466 Price code: CP T09

APRFX1 collapses and combines cross section sets for multigroup transport calculations. It performs group collapsing for as many isotopes, mixtures, and Legendre expansion sets as desired from the DLC-2B library. The DLC-2B library structure employs tenth lethargy unit intervals from 15 MeV to 111 keV and quarter lethargy intervals down to 0.414 eV. A 100th group 0.0 to 0.414 eV is used as a sink group. The code also determines the broad-group input source and generates averaged neutron velocities for use with transport calculations. This version of the code uses the DLC-2B library in ANISN-DOT format. Upscattering is not included. (ERA citation 08:020530)...Software Description: CDC6600; FORTRAN IV.

HRG3; Slowing-down Spectrum, Multigroup Constants.
J. L. Carter, and G. W. Perry.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-467 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048467 Price code: CP T18

The code computes the slowing down spectrum over the energy range 10 MeV to 0.414 eV in either the B1 or P1 approximation, using 68 groups of neutrons with a constant group width of delta u = 0.25. The calculated flux and current spectra are used to reduce the original 68-group cross section data to average values over as many as 33 broad groups. Output is printed and may also be punched in formats

for input to any of several spatial multigroup codes. The maximum number of broad groups is 33. Broad-group boundaries are adjusted internally to coincide with one of the 68 fine-group boundaries. (ERA citation 08:020531)...Software Description: UNIVAC1108; IBM360,370; FORTRAN IV; CSCX (UNIVAC1108); OS/360 (IBM360); 64K memory, normal input, output, program, and punch units, 1 unit for library, 1 to 4 scratch units or their equivalent on drum (UNIVAC1108); 200K memory, standard I/O units, 1 unit for library, and 1 scratch unit.

BUBL1; Fuel Swelling and Gas Release Simulation.
H. R. Warner.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-468R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048468 Price code: CP T09

BUBL1 predicts fuel swelling and fission gas release from nuclear fuels, based on movement of fission gas bubbles in solids by a surface diffusion mechanism under the action of a thermal gradient (see reference 3). Interactions of the bubbles with dislocations and grain boundaries provide temporary trapping sites, prior to release. The current version of BUBL1 is restricted to isothermal problems with non-varying hydrostatic pressure and thermal gradient histories. (ERA citation 08:020608)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 65K memory, a printer, and a plotter.

PMS1; Fast Neutron Polarization Experiment.
G. W. Morrison, F. P. Gibson, and T. G. Miller.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-469 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048469 Price code: CP T09

PMS1 corrects experimental fast neutron polarization data for finite geometry and multiple scattering effects, when liquid helium is the polarizer analyzer. No more than five collisions are allowed and liquid helium must be the polarizer analyzer. The total number of energy points for which phase shifts are given must be less than 100. (ERA citation 08:022500)...Software Description: IBM360; FORTRAN IV(H) and BAL; OS/360; 32K memory.

GRAMP; Reich-Moore Parameters of Unresolved Resonances.
M. Goldsmith.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-470R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048470 Price code: CP T03

GRAMP randomly generates Reich and Moore parameters for multilevel unresolved resonances of fissile isotopes. The maximum number of resonances per spin state is 100. Two compound nucleus spin states are allowed and each spin state may have two open fission channels. (ERA citation 08:022387)...Software Description: CDC6600; FORTRAN IV.

GAPER2D; Two-Dimensional Perturbation Calculation from 2DF Output.
R. J. Archibald, and D. A. Sargis.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-471 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048471 Price code: CP T11

GAPER2D is a two-dimensional transport perturbation theory program using the real and adjoint fluxes and currents from 2DF problem results to compute reactivity changes due to small perturbations in reflected multiregion systems. Scattering anisotropy is limited to the P1 term. (ERA citation 08:020532)...Software Description: UNIVAC1108; FORTRAN V; EXEC2 or EXEC8; 65K fast memory, 2 tape units, 4 drum or disk files.

CHIC-KIN; Fast and Intermediate Power Transients.
J. A. Redfield.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-473R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048473 Price code: CP T12

CHIC-KIN treats fast and intermediate reactivity transients in a water-cooled heterogeneous nuclear reactor. The program calculates the power, temperatures, and internal pressure surges when control rod motion, inlet temperature, inlet flow, and system pressure are known functions of time. The reactor model considered is a single-pass, water-cooled core represented by a single, fuel-element-coolant-passage system with reactivity feedback to the kinetics equations. Restrictions include - 1 through 20 axial sections 2 through 10 radial sections 2 through 30 mass-velocity or pressure-drop pairs 2 through 30 inlet enthalpy pairs 2 through 30 exit enthalpy pairs 2 through 30 system-pressure pairs. (ERA citation 08:020632)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1.

QX1; Quasistatic Spatial Reactor Kinetics Code.
D. A. Meneley.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-474 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048474 Price code: CP T14

QX1 solves the multigroup, one-dimensional, time-dependent diffusion equations. Problem geometry may be plane, cylindrical, or spherical. Steady-state initial conditions may be established either for a source-free system or for a system with an external neutron source. The reactor may be perturbed by changing material volume fractions and/or temperatures or by changing the neutron source level. A first-collision pulsed source distribution may be specified. Resonance absorption feedback is calculated by groupwise interpolation in a cross-section versus temperature table. A highly simplified fuel temperature model is included. Maximum of 30 energy groups, 15 downscatter groups, 6 delayed neutron families, 20 spatial regions, 16 material mixtures per region, 150 mesh points. (ERA citation 08:020533)...Software Description: IBM360/75; FORTRAN IV; OS/360; 450K byte memory, input, output, and punch datasets, a maximum of 2 cross section datasets, and a maximum of 6 scratch datasets.

CRECT;CHECKER;RIGEL;PLOTFB; LISTFC;DICTION;SLAVE3;DAMMET ENDF/B V2 Processing Codes.
O. Ozer, and E. M. Pennington.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-475 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048475 Price code: CP T15

This package of eight programs is designed for processing ENDF/B II (Evaluated Nuclear Data File Version B Format II) tapes. CRECT, which processes Version III ENDF/B data as well as earlier versions, provides a means of correcting assembled data on a tape by insertion and deletion of data. CHECKER checks that the ENDF/B BCD card image format tapes are in proper format and all fields are within specified limits, rather than the physics of the data library. Angular distributions reconstructed from Legendre coefficients are checked to ensure they are everywhere positive. RIGEL will perform any or all of the following operations - selectively retrieve ENDF/B data on from 1 to 9 ENDF/B tapes, merge retrieved ENDF/B data onto from 1 to 8 ENDF/B result tapes, change tape arrangement (from standard to alternate or vice versa) and change tape mode. LISTFC, which processes Version III ENDF/B data as well as earlier versions, produces interpreted listings of information from BCD standard arrangement ENDF/B tapes. DICTION constructs a new section dictionary (file 1, section 451) for an entire ENDF/B tape. If a section dictionary is already present it is replaced. PLOTFB processes ENDF/B library tapes which contain data embedded within a necessary library structure in order to produce comprehensive listings and/or plots. (ERA citation 08:022349)...Software Description: The system is written in FORTRAN IV for a CDC6600 or IBM 360 computer under the SCOPE or OS/360 operating system. Memory requirement is 74K octal words for the CDC6600 and 300K bytes for the IBM 360.

CAGE;BIRD;SPEC; Time-of-Flight Data Analysis.
P. Doultremont, D. H. Houston, and J. C. Young.
Gulf Radiation Technology, San Diego, CA. 1984, mag tape ANL/NESC-476 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048476 Price code: CP T11

CAGE/BIRD/SPEC is a package of three independent codes designed for the reduction and processing of neutron time-of-flight spectra in pulsed multiplying or non-multiplying assemblies. A maximum of 35 groups for the multigroup calculation for CAGE and BIRD. Deadtime correction routines of SPEC are designed for TMC 201, 211, and 212 1024-channel analyzers and for an on-line CDC1700. (ERA citation 08:022501)...Software Description: UNIVAC1108; FORTRAN V; EXEC8; 64K memory and one 100K area of fast drum for CAGE and BIRD. 50K memory, 2 scratch files and, on option, several input/output files for SPEC.

3DXT;DEP3; Three-Dimensional Xenon Transient and Depletion.
W. M. Stacey, Jr., and D. C. Wade.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-477R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048477 Price code: CP T14

These two codes were developed for use with detailed reactor physics calculations to obtain 3-dimensional xenon transient (3DXT) and depletion (DEP3) calculations. They are well-suited for survey studies and because they incorporate three-dimensional effects with thermal feedback and rod search capabilities, are useful for assessing situations such as rod misalignments or fuel-loading and coolant-flow asymmetries which are time-consuming and often impossible to detect with detailed 1- or 2-dimensional codes. 3DXT maximum - 100 time-steps DEP3 maximum - 30 time-steps with 1 to 5 xenon-steps per depletion-step. (ERA citation 08:020534)...Software Description: CDC6600; FORTRAN IV; 64K memory.

BETTIS ENVIRONMENTAL ROUTINES; MODEL6/ 3.3;MODEL7/2.0; Modified Bettis Environmental Library Scope 3.3.
C. J. Pfeifer, M. L. Dech, R. W. McCraney, G. R. Poetechat, and G. L. Russell.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-478 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048478 Price code: CP T15

The BETTIS ENVIRONMENTAL ROUTINES extend the FORTRAN language by modifying some of the standard CDC6600 library routines and by adding routines to the library to facilitate decimal input and output, file maintenance, scratch I/O, storage allocation, utility functions, operating system interfacing, and operator communication. MODEL (MODified Environmental Library) differs from the original Bettis version in that it allows the operating system, rather than the environmental package, to control the operating environment. (ERA citation 08:022835)...Software Description: CDC6600,7600; FORTRAN IV and ASCENT (Bettis), FORTRAN IV and COMPASS (MODEL 6/3.3, MODEL 7/2.0); SCOPE 2.0 (Bettis), SCOPE 3.3 (MODEL), SCOPE 2.0 (MODEL 7/2.0); For the Bettis version 65,356 words of 60-bit core storage (more or less can be used), a system (6603) disk, at least 2 magnetic tapes, at least 4 non-system disks, each on its own channel, and CDC-280 plotting hardware. For the MODEL versions 65,356 words of 60-bit core storage (more can be used), 2 magnetic tapes, and 4 mass storage devices, each on its own channel.

FREADM1; Fast Reactor Core Accident Analysis.
D. D. Freeman, E. G. Leff, D. J. Bender, and W. G. Meinhardt.
General Electric Co., Sunnyvale, CA. Breeder Reactor Development Operation. 1984, mag tape ANL/NESC-479 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048479 Price code: CP T13

FREADM1 is a fast reactor, multichannel, accident analysis program designed to efficiently simulate a reactor transient from initiation to the point of core disassembly. Models are included for nuclear kinetics (point model), core thermo-hydraulics, voiding, fuel redistribution, failure propagation, programmed reactivity insertion, and the dynamics of primary-system coolant flow. A broad range of assumed accident initiating and propagating activities may be simulated using trig-

gering logic included in the code. FREADM1 is restricted to accidents which initiate and propagate uniformly within annular or cylindrical coaxial core regions. (ERA citation 08:020655)...Software Description: GE635; FORTRAN IV; GECOS-III; 24K memory with 3 peripheral storage units.

FUMBLE; Fast Reactor Fuel Burnup and Management.
P. Greebler, and C. L. Cowan.
General Electric Co., Sunnyvale, CA. Breeder Reactor Development Operation. 1984, mag tape ANL/NESC-480 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048480 Price code: CP T13

FUMBLE computes the fuel burnup in reactor operations. This includes the evaluation of reactivity effects, breeding (or depletion) and inventories of fuel, and fuel costs for changing economic conditions and supplied fuel compositions throughout the reactor lifetime (or for as many refueling operating intervals as desired). Considerable flexibility is allowed in the specifications of reactor refueling, including fuel compositions for the startup reactor, recycle schemes and fissile makeup compositions for subsequent core loadings, amounts of fuel to be replaced in different positions of the reactor at any refueling, and shuffling of fuel from one part of the reactor to another or temporarily storing fuel discharged from the reactor for later additional burnup. The refueling specifications may be changed from one refueling operating interval to another, as well as operating interval time, power rating, and load factor. Fuel costs may be evaluated for several different sets of cost input data (different economic assumptions) and may be based on net costs accrued and energy produced by spent fuel batches and/or on net costs incurred for all fuel held and energy produced by the entire reactor for each operating interval. (ERA citation 08:020410)...Software Description: GE635; FORTRAN IV; GECOS-III; Minimum computer memory is 48K on the GE635. Two tapes and one auxiliary which may be required for some cases.

BUSHL; Cylindrical Shell Buckling Collapse Analysis.
A. L. Thurman.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-481R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048481 Price code: CP T11

BUSHL determines the load at which a finite-length shell of revolution will buckle when subjected to hydrostatic pressure, axial compression, or a combination of the two. Elastic-plastic material properties are used with deformation theory and thin-shell theory to analyze the shell. BUSHL was developed primarily for the buckling collapse analysis of zircaloy-clad oxide fuel rods. BUSHL uses only one Fourier component for the circumferential variations of the buckling displacements restricting its applicability to shells of near cylindrical shape. BUSHL is best-suited for problems where the parameter (L**2)/Rt is less than 1500 for cylinders. (ERA citation 08:020609)...Software Description: CDC6600; FORTRAN IV; SCOPE; Printer, on-line punch, plotter, and a minimum of 100,000 (octal) words storage.

COMNUC;CASCADE; Compound Nucleus Reaction.
C. L. Dunford, and A. Nickols.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-482 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048482 Price code: CP T11

COMNUC calculates neutron reaction cross sections using a statistical model for decay of the compound nucleus. Competing reaction types permitted are elastic, discrete and continuum inelastic, gamma ray emission, capture, fission, and n,2n. CASCADE solves the intranuclear gamma ray cascade equation to determine secondary particle emission probabilities. Competing processes considered are gamma ray emission, neutron emission and fission. COMNUC - Only reaction types listed above may be analyzed, but other reactions such as n,p and n,alpha may be included easily. CASCADE - Only dipole radiation is permitted in the gamma ray cascades. No discrete channels are permitted - only continuum particle emission. (ERA citation 08:022366)...Software Description: IBM360; FORTRAN IV with one Assembler language subroutine for performing internal I/O.4 OS/360; 150K bytes.

REPP; Thermal-Hydraulic Water Reactor Design.
R. M. Hiatt, and C. Bromley, Jr.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-483 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048483 Price code: CP T11

The REPP computer code provides a method for (1) evaluating fuel temperatures and critical heat flux margins for a fixed reactor core and fuel design, (2) determining the number of fuel pins required to maintain specified heat flux margins from burnout at a given reactor power level, (3) determining the diameter of a fuel pin to design within fuel centerline temperature limits at a specified reactor power level, (4) evaluating the sintering effect on fuel temperature, (5) calculating pressure drop and coolant properties for single-phase and two-phase flow for fuel operating at average reactor conditions and a theoretical hot-pin hot-channel condition, and (6) calculating pressure drop across several types of fuel pin spacers. (ERA citation 08:020322)...Software Description: UNIVAC1108; FORTRAN V; CSCX; 51K addressable core storage.

FIGS; IBM360 and 2250 FORTRAN Graphics Subroutines.
C. L. Dunford, and A. Nickols.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-484 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048484 Price code: CP T11

FIGS is a FORTRAN-callable subroutine package for the support of interactive computing programs utilizing an IBM System/360 computer and an IBM2250 display unit. (ERA citation 08:022836)...Software Description: IBM360; FORTRAN IV and BAL; OS/360; IBM360 computer with an attached IBM2250 display unit.

GASPAN; Complex gamma-Ray Spectra Analysis.
J. D. Michne.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-485R U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048485 Price code: CP T09

GASPAN analyzes output pulses from a lithium-drifted germanium semiconductor detector to define complex gamma-ray spectra of routine crud and filtrate samples. GASPAN must be aligned with the particular detector system it uses. It will accept data for up to 1024 channels. (ERA citation 08:021566)...Software Description: CDC6600; FORTRAN IV; SCOPE; CDC6600 and CalComp plotter.

ANCON; Space-Independent Reactor Kinetics Code.
J. C. Vigil, and E. T. Dugan.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-486 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048486 Price code: CP T11

1NCON solves the point-reactor kinetic equations including thermal feedback. Lump-type heat balance equations are used to represent the thermodynamics, and the heat capacity of each lump can vary with temperature. Thermal feedback can be either a linear or a non-linear function of lump temperature, and the impressed reactivity can be either a polynomial or sinusoidal function. (ERA citation 08:020535)...Software Description: CDC6600; IBM360,303x; FORTRAN IV; SCOPE 3.2 (CDC6600) and OS/360 (IBM360); ANCON requires 32K words of central memory, one peripheral storage device (logical unit 1), card reader (logical unit 10), printer (logical unit 9), and card punch. Standard system-library functions and a CLOCK routine are used. The CLOCK routine is not essential. A dummy CLOCK routine is provided with the IBM360 version package.

STEAM-67; 1967 ASME Steam and Water Properties.
M. P. Gurgess, G. L. Fuller, H. Allen, and A. H. Kaiser.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-487 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048487 Price code: CP T11

STEAM-67 is a set of routines for calculating the properties of steam and water according to the ASME Steam Tables, 1967, which have been modified in accordance with the ASME paper. Modifications were made to improve program running time as well as to correct some existing program errors. Corrections were also made to routines for the liquid region to improve accuracy on the IBM360 computer. CENTER is an auxiliary control program which selects the proper STEAM-67 routines. (ERA citation 08:021227)...Software Description: IBM360,370,303x; FORTRAN IV; OS/360; 140K bytes of memory are required to execute the sample problems.

NOISY1; Auto- and Cross-Spectral Densities.
J. R. Sheff.
Sheff (James R.) Co., Richland, WA. 1984, mag tape ANL/NESC-488 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048488 Price code: CP T13

Auto- and cross-spectral density functions are calculated for neutron fluctuations in nuclear reactors. The calculations are point-wise, space-dependent in cubical reactors which are homogeneous and bare. Either neutron fluctuations or the fluctuations seen by a neutron detector can be specified. Fluctuations between either two points or between two finite regions can be considered. The finite regions or simulated detectors must either fully overlap or not overlap and are restricted in shape to rectangular parallelepipeds. Maximum of 50 terms per dimension in the six-dimensional series. The limit is thus 50**6 or about 16-billion terms. This is large enough so that the limit is really budgetary. Automatic convergence checking limits the maximum number of terms to approximately 300,000. (ERA citation 08:020536)...Software Description: UNIVAC1108; FORTRAN V; CSCX or EXEC2; 52K words memory.

TRIFIDO; Pulsed Neutron Source Data Analysis.
F. Difilippo, and N. Pieroni.
Comision Nacional de Energia Atomica, Buenos Aires (Argentina). Dept. de Reactores. 1984, mag tape ANL/NESC-489 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048489 Price code: CP T03

The code calculates the decay constant and the population of the fundamental prompt neutron mode extrapolated to initial time, using pulsed neutron experimental data. These data are the resulting time profile of the neutron density of a subcritical multiplicative assembly which is repetitively pulsed with short bursts of neutrons. The time profile is measured with an appropriate detector and recorded with a time analyser. With the calculated parameters the code determines the values of (k*beta)/L and reactivity by means of the Garelis-Russell method, and reactivities using the Gozani and Sjostrand methods. The code is presently restricted to 256 experimental data points (for example, those provided by a TMC multichannel analyser). This is adequate for most pulsed neutron measurements. The restriction can be easily overcome if necessary by changing a dimension card. (ERA citation 08:020633)...Software Description: IBM360; FORTRAN IV; OS/360; 11K words of storage.

JOSHUA OPERATING SYSTEM; Data Storage, Retrieval, and Display.
H. C. Honeck, and R. L. Boyce, Jr.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-490 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048490 Price code: CP T99

JOSHUA is a scientific, modular data-based system for batch and terminal operation. Large volumes of data can be stored and retrieved for computation and display. (ERA citation 08:020537)...Software Description: IBM360,370,303x; FORTRAN IV (60%) and Assembler language (40%); OS/370, OS/3033; 200K bytes for batch operation, IBM3270 display station.

MOD5; Stochastic Model of Neutron Slowing-down.
T. J. Williamson.
Naval Postgraduate School, Monterey, CA. 1984, mag tape ANL/NESC-491 U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048491 Price code: CP T12

MOD5 calculates the time- and energy-dependent evolution of the neutron density in homogeneous media following initiation of a) a monoenergetic source distributed over a finite time interval, or b) a source of arbitrary spectrum with a delta-function distribution in time. Effectively the code produces Green's function solutions to the slowing-down equation in discrete numerical form. Leakage is treated in the diffusion approximation. The program a) calculates spectra and energy moments at selected times following the burst of source neutrons, b) evaluates the time-dependent neutron density and slowing-down density at selected energies and computes moments of these densities, c) calculates time-dependent distributions of capture, leakage and first fission, and moments of these distributions, d) calculates steady-state central core neutron flux and leakage flux in detail and in group-averaged form, and e) calculates parameters such as keff. (ERA citation 08:022502)...Software Description: IBM360; FORTRAN IV; IBM360 CP-CMS; 175K bytes memory, normal input, output, program, and punch units, 6 cylinders of IBM2314 or equivalent direct-access storage.

RAMP1; Reich-Moore Resolved Region Cross-Sections.
M. R. Bhat.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-492 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048492 Price code: CP T09

RAMP1 calculates scattering, capture, fission, and total cross sections from Reich-Moore resolved resonance parameters. The resonance parameters are assumed to be in ENDF/B Version II data format. Cross sections may be Doppler-broadened if so desired. The program assumes that the resolved resonance parameters are given for a single energy range for all isotopes and can handle resonance data up to a maximum of 10 different isotopes with a total of 500 resonances over all isotope energy ranges and L values and an L value not exceeding 5. (ERA citation 08:022503)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.0; 40K (octal) memory.

TROUT; MUG Multigroup Cross Section Library Maintenance.
R. A. Davis, W. A. Duncan, and M. D. Kelley.
General Electric Co., San Jose, CA. Nuclear Energy Div. 1984, mag tape ANL/NESC-493 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048493 Price code: CP T11

TROUT is a file maintenance program which allows the user to alter, merge, delete, overlay or create multigroup cross section files in MUG format. Up to four file tapes may be mounted and merged into a single file tape. A file tape may not have more than 30 files. (ERA citation 08:020538)...Software Description: GE635; UNIVAC1108; FORTRAN IV; GECOS III (GE635) and EXEC2 (UNIVAC1108); 25K of fast memory, 6 tape drives, and 4000 words of peripheral storage.

ADEP; One-Dimensional and Two-Dimensional Few-Group Space-Time Kinetics.
R. S. Denning.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-494 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048494 Price code: CP T09

The time-dependent few-group neutron diffusion equations are solved in one or two dimensions. Lumped parameter thermal-hydraulic equations are used to calculate feedback. Variable dimensioning permits flexibility in the number of energy groups, number of delayed precursors, number of regions, and number of mesh points. Problems are initiated from equilibrium conditions. Zero flux boundary conditions apply at all surfaces. (ERA citation 08:020539)...Software Description: CDC6400; FORTRAN IV; SCOPE 3.3; 40,000 (octal) memory needed to load the basic program.

SYN; Two-Dimensional Synthesis Muitigroup Diffusion and One-Group Depletion.
M. D. Kelley.
Gerneral Electric Co., Sunnyvale, CA. Breeder Reactor Development Operation. 1984, mag tape ANL/NESC-495 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048495 Price code: CP T17

SYN contains two major segments, BISYN and BICYCL. The BISYN segment solves the two-dimensional multigroup neutron diffusion theory equations in r,z or x,y geometry using a noniterative synthesis method. This approach is designed to greatly reduce the computer cost of running two-dimensional multigroup problems at the risk of some loss in accuracy of the detailed flux distribution. This segment also contains a perturbation and effective delayed neutron fraction calculation. The BICYCL segment uses output from BISYN to solve the one-group neutron depletion equations. BICYCL allows the user to search on makeup or recycle isotopic compositions for a first cycle of a first core or for equilibrium concentrations. It also has provisions for fuel shuffling and the option to cycle back to BISYN in order to update the fluxes, one-group cross sections, etc. (ERA citation 08:020411)...Software Description: GE635; FORTRAN IV and GMAP; GECOS III; 51K of fast memory, 2 tape drives and 821,760 words of peripheral storage.

KAPLPLOT; KAPL CalComp Plotting Routines.
J. Brooking.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-496R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048496 Price code: CP T11

KAPLPLOT is the set of standard CalComp subroutines written at Knolls Atomic Power Laboratory to provide graphic output. GRLIN is used to draw an axis system, establish scaling factors, and enable the user to draw linear graphs. GRLOG is used to draw an axis system, establish scaling factors, and permit users to draw full logarithmic graphs. LINLG provides the capability of drawing semi-logarithmic graphs with linearly-scaled abscissas while LOGLN provides the same capability with linearly-scaled ordinates. PENSET initializes the plotting subroutines and draws the job identification,

time, date, and charge number. PENEND moves the pen off a completed plot and prevents subsequent plots from overwriting the completed plots. IPLOT moves the plotter pen from its current position to a new position. IDPLOT moves the pen a specified incremental distance in inches from its present position. PSCALE establishes the value of factors to be used by the SPLOT subroutine in scaling user data to fit on plotter coordinates. SPLOT causes the pen to move to coordinates which are obtained by applying PSCALE scale factors to user data. XCPLOT and YCPLOT cause alphabetic information to be written parallel to the direction of the abscissa axis, XCPLOT, or the ordinate axis, YCPLOT. PMARK causes a distinctive symbol to be plotted at the current position of the pen. PLTSIZE conveys to the plotting system information which will enable the plotting system to place the maximum number of plots in a minimum length of paper. (ERA citation 08:022837)...Software Description: CDC6600; FORTRAN IV and ASCENT; SCOPE; GRLIN, LINLG, and LOGLN each require 2000 octal locations.

RELO2; Failure Probability Calculation by Monte Carlo.
D. R. Rauth, and C. M. Smith.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-497R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048497 Price code: CP T11

RELO2 computes the failure probability for a single failure mode. Six options are available: option 1 calculates the interaction of two normally-distributed variates, option 2 calculates the interaction of two truncated normally-distributed variates, option 3 calculates the interaction of a normal variate with a Weibull variate, option 4 calculates the interaction of two Weibull distributions, option 5 calculates the interaction of a truncated normal variate with a Weibull variate, and option 6 calculates the interaction of a truncated normal and uniform variate. The number of random selections of the applied stress is restricted to 2000. (ERA citation 08:021436)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE 3.1; 74,000 (octal) words of memory are required for execution of the CDC6600 or 55,000 (octal) words of memory for execution on the CDC7600.

CONCEPT5;CONCEPT3; Power Plant Conceptual Cost Estimate.
C. R. Hudson, II, H. I. Bowers, J. E. Gratteau, and T. J. Zielinski.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-498 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048498 Price code: CP T14

The CONCEPT computer code system was developed to provide conceptual capital cost estimates for nuclear-fueled and fossil-fired power plants. Cost estimates can be made as a function of plant type, size, location, and date of initial operation. The output includes a detailed breakdown of the estimate into direct and indirect costs similar to the accounting system described in document NUS-531. Cost models are provided in CONCEPT5, the fifth generation in the development of the CONCEPT package, for single- and multi-unit pressurized water reactors, boiling water reactors, and coal-fired plants with and without flue gas desulfurization equipment. The CONCEPT5 models are updated models of those available in CONCEPT3 and, in addition, this edition contains historical factory equipment cost data for the generation of cost indices and escalation rates; indirect costs are calculated as a function of unit size rather than a function of direct costs; and an indirect cost account for owner's costs and an improved time-dependent escalation feature are included. The CONCEPT3 models and cost data are outdated; the package is being retained in the library since it is the only UNIVAC1108 machine version of CONCEPT available and could prove helpful in converting the latest IBM release. (ERA citation 08:020474)...Software Description: IBM360,370; UNIVAC1108; FORTRAN IV (H) (98%) and Assembly language (2%) (IBM360); FORTRAN IV (UNIVAC1108); OS/360 (IBM360) and EXEC8 (UNIVAC1108). Less than 270K bytes, four scratch files, two support files, and the standard I/O units are required for CONCEPT5; 150K bytes, one scratch disk or tape, two support tapes, and the standard I/O units are needed for CONCEPT3.

MIRAB;MIRAP; Containment System Iodine Removal.
R. L. Ritzman.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-499 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048499 Price code: CP T11

The code MIRAB is used for BWR reactors and MIRAP is for PWR reactors. The codes calculate the removal of fission product iodine from a dry-type BWR/PWR containment system atmosphere under reactor accident conditions. The method considers the simultaneous removal by natural deposition on surfaces or absorption in water, by engineered spray system operation, by adsorption on filters, and by leakage from the containment. In addition, the simultaneous behavior of three iodine forms is modeled - specifically elemental iodide, methyl iodine, and particulate iodine. The programs generate iodine concentrations and accumulations throughout the containment system as a function of time after start of the accident. (ERA citation 08:020656)...Software Description: CDC6400; FORTRAN IV, SCOPE 3.3; Each code uses 42K (octal) memory, card reader, line printer, and one tape.

FRCRL2; LOCA Fission Product Release Analysis.
R. L. Ritzman.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-500 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048500 Price code: CP T03

The code calculates the cumulative fractional release of fission products from nuclear reactor fuel under postulated loss-of-coolant accident conditions. The mathematical model for release is based on simple volume diffusion theory and the equivalent-sphere approximation of fuel porosity. Both the operational preaccident release component and the accident core thermal transient-induced release component are calculated. Detailed core temperature data are needed to make the latter set of computations. In addition, specific core power distribution factors and fission product diffusion parameters must be supplied. The calculation is limited to maxima of 12 fission product species, 10 radial core regions, and 11 axial core regions. Also, four separate sets of fission product diffusion parameter values must be supplied for different temperature ranges or assumed atmospheric conditions. (ERA citation

08:020657)...Software Description: CDC6400; FORTRAN IV; SCOPE 3.3; 62K (octal) memory, card reader, line printer.

ENDRUN2; Multigroup Constants from ENDF/B Data.
B. A. Hutchins, C. L. Cowan, M. D. Kelley, and J. E. Turner.
General Electric Co., San Jose, CA. Nuclear Energy Div.
1984, mag tape ANL/NESC-501 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048501 Price code: CP T14

ENDRUN2 is used to calculate multigroup constants from energy-dependent, microscopic cross sections, resonance parameters, and inelastic level data input in the evaluated nuclear data file (ENDF/B) formats. Data is processed for one material at a time and the output multigroup file includes both infinitely-dilute group cross sections and self-shielding, Bondarenko-type f-factors so that the resulting generalized file is independent of reactor composition. The multigroup data may be output on punched cards, a standard library tape, or plotted over any energy range. (ERA citation 08:020412)...Software Description: GE635; FORTRAN IV except for use of RWSBT and NPOST in the GE compressed binary input and output routines. FORTRAN versions of these routines are available, also; GECOS III. The code requires 52K memory, including a 10K overlap with loading routines. Up to 5 tapes and 7 auxiliary units (disks in the authors' environment) may be required, but the number of tapes may be reduced by use of permanent disk files with the card reader as the input unit.

EDITOR; ENDF/B Tape Processing and Editing.
C. L. Thompson, J. R. Stockton, L. M. Petrie, R. Q. Wright, and S. K. Penny.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-502 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048502 Price code: CP T11

EDITOR produces readable listings of the contents of ENDF/B nuclear data cross section tapes. It also allows copying, altering mode, merging and punching of the data on one or more ENDF/B tapes. A maximum of 50 materials may be handled in one batch, where a batch is a group of associated input instructions. A maximum of 5 files per material and 15 sections per file may be requested in each batch. Files 1 to 5, 7, 12 to 15, and 23 will be processed by the program. Other files will be ignored. (ERA citation 08:020540)...Software Description: IBM360; CDC6600; FORTRAN IV; OS/360 (IBM360), SCOPE (CDC6600); Approximately 300K bytes of core.

DUZ2; Two-Dimensional Axisymmetric and Plane Elastic-Plastic Stress Calculations.
W. D. Peterson, and C. Jeffrey.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-503R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048503 Price code: CP T16

DUZ2 performs two-dimensional elastic-plastic stress calculations. The program treats axially symmetric bodies or plane regions (plane stress or plane strain) assuming deformation theory. Loading conditions may be a non-uniform temperature distribution, body forces, and boundary displacements or stresses. The program provides for up to 99 regions, to describe material properties and boundary conditions. There may be up to 5000 points in a rectangular array, with at most 250 mesh rows or columns. Because of the initial strain method, plastic strains should not be significantly larger than elastic strains. (ERA citation 08:020570)...Software Description: CDC6600; Although the program is written primarily in FORTRAN IV, certain inner loop routines were optimized using COMPASS. Also, the program calls on COMPASS routines which are a part of the Bettis computing environment. SCOPE 3.1. The program was written for a CDC6600 with a central memory size of at least 64K, reader, printer, a system disk and 4 non-system disks each on its own channel. The program makes optional use of extended core storage and CDC-280 microfilm output.

THRES2; Statistical Model Reaction Cross Sections.
S. Pearlstein, and L. G. de Viedma.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-504 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048504 Price code: CP T09

THRES2 calculates neutron-induced reaction cross sections from 0 to 20 MeV and fission spectrum averages for nuclides having 21 to 82 protons. Reaction products considered are 2n, 3n, p, d, t, He-3, alpha, np, nd, nt, n-He3, n-alpha, pn, 2p, p-alpha, alpha-n, alpha-p, and dn. Maxima of 19 reaction types. (ERA citation 08:022355)...Software Description: CDC6600;IBM360; FORTRAN IV; SCOPE (CDC6600), OS/360 (IBM360); The program uses 13K (decimal) on the CDC6600.

TDOWN; Spatial and Composition-Dependent Cross Sections.
C. L. Cowan, B. A. Hutchins, and J. E. Turner.
General Electric Co., San Jose, CA. Nuclear Energy Div.
1984, mag tape ANL/NESC-505 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048505 Price code: CP T99

TDOWN generates spatial and composition-dependent cross section sets from a Bondarenko type, generalized cross section file called GMUG. A TDOWN problem can be a simple description of material compositions with an input flux spectra or a problem can consist of a multi-region, two-dimensional reactor description with several zero- or one-dimensional flux solutions to provide the flux for spectral adjustments of the cross section sets. Most of the restrictions on TDOWN are due to the limitations of the linked codes. Some of these limitations are - a generalized file has a maximum of 100 energy groups, and up to 120 material cross section sets may be generated. (ERA citation 08:020541)...Software Description: GE635; FORTRAN IV; GECOS III. The code requires 32K memory on a GE635, including a 10K overlap with the loading routines. In addition to the usual input/output units, 3 tape handlers and 6 files on a peripheral devise (disk at the authors' installation) are used.

JP1XR; Coupled-Channel Scattering Cross Section Calculations.

C. J. Slavik.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-506R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048506 Price code: CP T11

JP1XR computes scattering cross sections and related quantities for the scattering of nucleons or composite particles from any collective nucleus, even or odd A, vibrational or rotational. The projectile can be charged or uncharged and can have spin 0, 1/2, or 1. Maximum of 100 angles for which the differential quantities (cross section and polarization) are to be computed. (ERA citation 08:022504)...Software Description: CDC6600; FORTRAN IV.

PHASER; Phase Shift Cross Section and Polarization Calculations.
C. J. Slavik.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-507R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048507 Price code: CP T03

PHASER computes the following quantities for the scattering of neutrons from nuclei: total, elastic, and reaction cross sections, differential shape and compound elastic cross sections, differential polarizations, differential and integrated compound level inelastic cross sections, compound and shape elastic Legendre moments in the center-of-mass system. Maximum of 15 states to be considered in the Hauser-Feshbach calculation. (ERA citation 08:022505)...Software Description: CDC6600; FORTRAN IV. SCOPE.

MUCHA1;MUCHA2; Multiple Channel Analysis Emergency Core Cooling.
R. A. Cudnik.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-508 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048508 Price code: CP T13

MUCHA1 predicts the thermal and hydraulic behavior of any two reactor fuel rods and their associated parallel flow channels during a loss-of-coolant accident using as boundary conditions plenum fluid conditions determined by MUCHA2 or a system-oriented code. MUCHA2 predicts the thermal and hydraulic behavior of the primary coolant within the reactor pressure vessel during a loss-of-coolant accident. The heated core is represented by two equivalent fuel rods and their associated parallel flow channels. A plenum model has been developed to predict the upper and lower plenum fluid conditions throughout the accident sequence for use as boundary conditions for the parallel core channels. In MUCHA1 the two fuel rods can be represented by up to a total of 15 radial nodes. Each fuel rod and its associated flow channel may be represented by up to 12 axial segments. MUCHA2 applies the same restrictions to each pair of equivalent fuel rods. (ERA citation 08:020658)...Software Description: CDC6400; FORTRAN IV; SCOPE 3.3; MUCHA1 requires 120K (octal) memory and one tape for restart capability MUCHA2 requires 120K (octal) memory, one tape for restart capability, and one tape for storing plenum boundary conditions.

ETOT2; Thermal Libraries from ENDF/B Data.
C. L. Beard, and R. A. Dannels.
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Energy Systems Div. 1984, mag tape ANL/NESC-509 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048509 Price code: CP T12

ETOT2 processes basic nuclear information given in the ENDF/B library tape Formats I and II and produces data decks for use in the generation of KATE, THERMOS (NESC Abstract 184), TEMPEST (NESC Abstract 50), and LASER (NESC Abstract 249) libraries. In addition to the restrictions on the ENDF/B data itself, ETOT2 has the following restrictions - Maximum number of groups or points = 309. Maximum number of resolved resonances = 500. (ERA citation 08:020542)...Software Description: CDC7600; FORTRAN IV; CDC7600 SCOPE 1.7. The code requires 50K (decimal) memory on the CDC7600, uses 1 scratch tape, 1 library tape, and the standard input/output and punch units.

VIM1;VIM1X; Monte Carlo Critical Assembly Analysis.
L. B. Levitt, and R. C. Lewis.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-510 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048510 Price code: CP T99

VIM1 is a Monte Carlo code designed for the analysis of fast critical experiments. It has been expressly prepared for the analysis of fast critical assemblies of the plate-drawer type such as ZPPR, ZPR-3, and ZEBRA. The library uses point cross section data, rather than multigroup constants. VIM1 is restricted to critical assemblies of the plate drawer type, and the energy range must be between 10 MeV and 10 eV. (ERA citation 08:020634)...Software Description: CDC7600; IBM360; FORTRAN IV (CDC 7600), FORTRAN IV and BAL (IBM360); SCOPE 1.1 (CDC7600) and OS/360 (IBM360); 65K (decimal) fast central memory, 80K ECS, and 1 magnetic tape unit are required on the CDC7600. 650K bytes and 1 tape units are required on the IBM360.

VENUS2; Two-Dimensional Coupled Neutronics-Hydrodynamics.
J. F. Jackson, R. B. Nicholson, and D. P. Weber.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-511 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048511 Price code: CP T11

VENUS2 is an improved edition of the VENUS fast-reactor disassembly program. It is a two-dimensional (r-z) coupled neutronics-hydrodynamics code that calculates the dynamic behavior of an LMFBR during a prompt-critical disassembly excursion. It calculates the power history and fission energy release as well as the space-time histories of the fuel temperatures, core material pressures, and core material motions. Reactivity feedback effects due to Doppler broadening and reactor material motion are taken into account. (ERA citation 08:020659)...Software Description: IBM360,370,303x;CDC7600; FORTRAN IV(H); OS/360 (IBM360) and SCOPE 2.1 (CDC7600); 440K bytes are used

for the IBM version when storing the data in double-precision. Single-precision storage is adequate for the converted CDC7600 version which requires 160,000 (octal) words of memory for execution. One peripheral storage device is needed if the graphical output option is used.

THETA1B; Fuel Rod Thermal Response Loss of Coolant Accidents.
C. J. Hocevar, and T. W. Wineinger.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-512 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048512 Price code: CP T16

THETA1B computes the thermal response characteristics of a nuclear fuel rod subjected to a loss-of-coolant accident environment. Small time-steps are used, resulting in long running times. (ERA citation 08:020323)...Software Description: IBM360/75; FORTRAN IV; OS/360; 400K bytes of core memory are required.

FORSIM; Solution of Partial or Ordinary Differential Equations.
M. B. Carver.
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs. 1984, mag tape ANL/NESC-514 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048514 Price code: CP T11

FORSIM is a FORTRAN oriented simulation program which automates the continuous transient solution of systems of ordinary and/or partial differential equations. The user writes his equations in a FORTRAN subroutine, following prescribed rules, and loads this routine along with the executive routines. The executive routines then read in initial data supplied by the user and proceed with the integration. Maximum of 1000 ordinary differential equations. (ERA citation 08:022838)...Software Description: CDC6600; FORTRAN Extended; SCOPE 3.4; 160,000 (octal) memory and 6 disk files, including input and output.

GENED ENVIRONMENTAL ROUTINES; Subroutine Library.
F. A. Wassem.
General Electric Co., San Jose, CA. Nuclear Energy Div. 1984, mag tape ANL/NESC-515 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048515 Price code: CP T09

The GENED ENVIRONMENTAL ROUTINES consists of a set of standard routines written at the General Electric Nuclear Energy Division and a set of standard GE635 system routines. (ERA citation 08:022839)...Software Description: GE635; FORTRAN IV AND GMAP; GECOS.

PTAC11; 2-Pass Assembler for the PDP-11 on 360.
E. W. Killian.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-516 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048516 Price code: CP T09

PTAC11 allows a programmer to assemble binary code for the Digital Equipment Corporation PDP-11 computer on the IBM360/75, taking advantage of the facilities and speed of the larger machine. The number of user defined symbols is limited to 800. The standard DEC mnemonics are used with two exceptions. The alternate mnemonics for BCC (branch if carry clear) and BCS (branch if carry set) are not used. The mnemonic for break trap is called BPT. (ERA citation 08:022840)...Software Description: IBM360/75; PL/I; OS/360; 100K bytes memory, usual I/O units and one tape unit.

HEATING5;HEATING3; One-, Two-, or Three-Dimensional Heat Conduction Program.
W. D. Turner, D. C. Elrod, I. I. Siman-Tov, and C. L. Wang.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-517 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048517 Price code: CP T11

HEATING5 is designed to solve steady-state and/or transient heat conduction problems in one-, two-, or three-dimensional Cartesian or cylindrical coordinates or one-dimensional spherical coordinates. The thermal conductivity, density, and specific heat may be both spatially and temperature-dependent. The thermal conductivity can be anisotropic. Materials may undergo a change of phase. Heat generation rates may be dependent on time, temperature, and position, and boundary temperatures can be time-dependent.and/or temperature-dependent. The mesh spacing can be variable along each axis. HEATPLOT is a temperature distribution plotting program which may be used with a plotting data set produced by HEATING5 to plot temperature contours (isotherms), temperature-time profiles, and temperature-distance profiles from a temperature distribution or from temperature changes relative to an initial temperature distribution. REGPLOT is a pre-processor graphics program which generates maps of the regions with labels for the materials, the heat generation function numbers, the initial condition function numbers, and the boundary condition function numbers specified by the input data to permit the user to visually check the HEATING5 input data. HEATING3 is designed to solve steady-state and/or transient heat conduction problems in one-, two-, or three-dimensional cartesian or cylindrical coordinates. Thermal conductivity, density, and specific heat may be dependent on temperature. Heat generation rates may be dependent on position and time, and the boundary temperatures may be time-dependent. (ERA citation 08:021414)...Software Description: The program is written in the FORTRAN IV and Assembly programming languages for implementation on an IBM 360/370/303x, CDC CYBER 73, or CDC7600 computer under the OS/360, OS/370, NOS/BE 1.2 or SCOPE 2.1 operating systems. Memory requirement is: 1256K bytes.

ERREST; Loss of Coolant Rod Bundle Critical Heat Flux Data Analysis.
M. A. Lintner.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-518 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048518 Price code: CP T13

ERREST sorts the rod bundle library of critical heat flux data and performs error calculations on sorted subsets. (ERA citation 08:020660)...Software Description: IBM360; FORTRAN IV; OS/360; 460K bytes.

NRTS OS/360 Remote Job Entry; OS/360 MVT Remote Job Entry System.
L. C. Richardson.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-519 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048519 Price code: CP T19

NRTS allows users at remote locations to submit jobs over slow or high speed communication lines to an IBM system 360/75 using the operating system that provides multiprogramming with a variable number of tasks. This program is an extension of the standard RJE program. Once a job has been entered execution proceeds under OS job management routines. (ERA citation 08:022841)...Software Description: IBM360/75; Assembler; OS/360 MVT Release 19.6; IBM360 with minimum of 512K bytes storage, using OS/360 MVT and an IBM2701 data adapter unit with synchronous data adapter TYPEII with the binary synchronous features, equipped for EBCDIC code and full transparency operation. Dual interface feature is required if line is to be switched between slow and high-speed operation. Direct access storage for RJE tables is typically less than 1-2311 DASD or 1-2314 disk pack. SYSIN data requirements are installation dependent. IBM1130 work station requirements include a single disk storage drive, 8K words of core storage, 1442-7 card read/punch, 1403-2 with RPQ F20724 or 1403-6 printer, binary synchronous communications adapters. Optionally, a 1627-1 plotter, 2415 magnetic tape, 1134 paper tape reader, 1055 paper tape punch, 2501 card reader, and 2250-4 scope are supported.

PHROG; Multi-Group Constant and Fast Spectra Calculations.
R. L. Curtis, G. L. Singer, F. J. Wheeler, and R. A. Grimesey.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-520 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048520 Price code: CP T16

PHROG generates energy dependent fast neutron spectra and associated multigroup cross section data suitable for use in diffusion and transport theory reactor design analysis. The solution utilizes 68 equal lethargy groups of cross section, source, and leakage data over an energy range extending from 10 MeV to 0.414 eV. These data are then coalesced into broad group form using the fluxes and currents as weighting functions. The code is restricted to a 68 group structure for input. (ERA citation 08:020543)...Software Description: IBM360; FORTRAN IV; OS/360; 200K bytes memory and six I/O devices including card reader, printer, card punch, tape unit for cross section library, and 2 scratch units.

SOCOOL2; Sodium-Fuel Interaction Analysis.
A. Padilla, Jr.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-521 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048521 Price code: CP T09

SOCOOL2 calculates the transient temperatures, pressures, and mechanical work energy when a molten material is instantaneously and uniformly dispersed in liquid sodium which is initially under acoustic constraint. The presence of an initial amount of sodium vapor or noncondensible gas cannot be taken into account. Time delays in the process of fragmentation and mixing of the molten material into the sodium cannot be considered. Heat transfer during the two-phase expansion of sodium is neglected. (ERA citation 08:020661)...Software Description: IBM360;UNIVAC1108; FORTRAN IV; CSCX (UNIVAC1108), OS/360 (IBM360); UNIVAC1108 - 19K words of memory, IBM360 - 115K bytes of memory.

ARC-SYSTEM; System Subprograms and Modules.
L. C. Just, H. Henryson, II, A. S. Kennedy, S. D. Sparck, and B. J. Toppel.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-522 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048522 Price code: CP T12

ARC-SYSTEM is the collection of systems subprograms and modules which provide the software environment necessary to execute the modular computational capabilities of the Argonne Reactor Computation (ARC) System on IBM360 systems. BCD input data restrictions are set at 100 ARC System data blocks and 2000 EBCDIC data cards. An ARC System data block is a named set of data containing named subblocks of data which are processed into data sets by a call to the system routine BCDDS. (ERA citation 08:020544)...Software Description: IBM360/50 and larger models: FORTRAN IV, Assembler language, and macro definitions; OS/360 Release 19; The resident portion of the system itself requires about 15K bytes. To test the system requires about 220K bytes plus one peripheral I/O device.

ESP; Monte Carlo Reactor Analysis Calculation.
S. N. Cramer, R. S. Carlsmith, G. W. Morrison, G. W. Perry, and J. L. Lucius.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-523 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048523 Price code: CP T16

ESP is a general-purpose Monte Carlo reactor analysis code. It covers the complete energy range of interest in reactor calculations and is designed for both eigenvalue and fixed source reactor and reactor cell calculations. Basic data are accepted only in the Version I, II, and III ENDF/B format. In addition to smooth data, the cross section preparation includes a detailed treatment of resolved and unresolved resonances and the free gas and s(alpha,beta) thermal models. The collision and source routines utilize the ENDF/B nonelastic secondary distributions, the anisotropic scattering data, and the fission spectra. The energy range may be divided into as many as 25,000 intervals, and over each interval the appropriately averaged cross sections are used as constant point-energy values. A general three-dimensional geometry description is available, as well as several specialized geometries. Use of fixed-source options allows calculations on non-

multiplying systems. A steady-state analysis of neutron histories is performed in computer core for such quantities as neutron fluxes, reaction rates, and cross sections, averaged over arbitrary energy and spatial regions. (ERA citation 08:020545)...Software Description: IBM360/75.91; FORTRAN IV and BAL; At least 350K bytes of computer core.

BESFIT; Diffraction Model Elastic Scattering Cross Sections.
S. Pearlstein.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-524 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048524 Price code: CP T09

BESFIT calculates differential elastic scattering cross sections using a Bessel function expansion, based on a diffraction model. Constant terms may either be supplied as input data or obtained by a least squares fitting of the data. A maximum of 101 angular points can be used. (ERA citation 08:022176)...Software Description: CDC6600; FORTRAN IV; Standard monitor.

ORTHIS;ORTHAT; Two-Dimensional Heat Conduction.
R. C. Durfee, and C. W. Nestor.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-525 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048525 Price code: CP T14

ORTHIS and ORTHAT are designed to solve steady-state and transient heat conduction problems, respectively, in two-dimensional geometries. Either Cartesian (x-y) or cylindrical (r-z, r-theta) coordinate systems may be used. Thermal properties, heat generation rates, and boundary conditions may be functions of position, time, or temperature. Maxima of 1000 vertical nodes 1000 horizontal nodes 10000 total nodes (rows*columns) 50 vertical regions 50 horizontal regions 2500 total regions (rows*columns) 300 materials 1500 steady-state iterations 5000 transient time-steps. (ERA citation 08:020662)...Software Description: IBM360; FORTRAN IV and BAL; OS/360; ORTHIS requires 700K, ORTHAT requires 1024K bytes.

CLUP77; Square Cell Collision Probability Calculations.
K. Tsuchihashi, and P. Henline.
Japan Atomic Energy Research Inst., Tokai. Tokai Research Establishment. 1984, mag tape ANL/NESC-526 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048526 Price code: CP T11

CLUP77 computes the collision probabilities in a multi-region square assembly of clustered fuel rods. The assembly can be made up of rods of infinite height and divided into rectangular pillars containing a nest of concentric annuli of different materials. The outer boundary of the assembly may be treated as reflective or a vacuum. A maximum of 120 assemblies are allowed and all assemblies must be symmetric both bilaterally and diagonally. (ERA citation 08:020546)...Software Description: FACOM230-60;IBM360; FORTRAN IV; FACOM Operating System (FACOM 230-60) and OS/360 (IBM360); 57K (octal) words on the FACOM, 250K bytes on the IBM360.

HERMES; Regional Radiological Effects Analysis.
B. W. Bentley, W. E. Black, W. L. Dotson, J. F. Fletcher, and D. R. Haffner.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-527 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048527 Price code: CP T14

The HERMES model calculates the regional radionuclide releases and radiation dose to the populace in a given year arising from the operation of nuclear facilities to meet electrical generation demands within a given study region. The following are all approximate dimension restrictions - 12 time-periods (months) 50 radionuclides 200 radionuclide sources (nuclear sites) 300 receptor locations. (ERA citation 08:020663)...Software Description: UNIVAC1108; FORTRAN IV and SLEUTH; CSCX; 65K memory and a magnetic drum or alternative device for storage of large amounts of data.

PREP;KITT; System Fault Tree Evaluation Codes.
W. E. Vesely, and R. E. Narum.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-528 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048528 Price code: CP T11

The PREP/KITT computer program package obtains system reliability information from a system fault tree. The PREP program finds the minimal cut sets and/or the minimal path sets of the system fault tree. (A minimal cut set is a smallest set of components such that if all the components are simultaneously failed the system is failed. A minimal path set is a smallest set of components such that if all of the components are simultaneously functioning the system is functioning.) The KITT programs determine reliability information for the components of each minimal cut or path set, for each minimal cut or path set, and for the system. Exact, time-dependent reliability information is determined for each component and for each minimal cut set or path set. For the system, reliability results are obtained by upper bound approximations or by a bracketing procedure in which various upper and lower bounds may be obtained as close to one another as desired. The KITT programs can handle independent components which are nonrepairable or which have a constant repair time. Any assortment of nonrepairable components and components having constant repair times can be considered. Any inhibit conditions having constant probabilities of occurrence can be handled. The failure intensity of each component is assumed to be constant with respect to time. The KITT2 program can also handle components which during different time intervals, called phases, may have different reliability properties. (ERA citation 08:020664)...Software Description: IBM360;UNIVAC1108; FORTRAN IV; OS/360 MVT (IBM360); 350K bytes on the IBM360.

ANVENT; Los of Coolant Analysis Duke Power McGuire Units.
J. L. Kelly, and R. S. Krell.
Duke Power Co., Charlotte, NC. 1984, mag tape ANL/NESC-529 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048529 Price code: CP T03

The ANVENT program was developed to analyze thermal effects of a loss-of-coolant accident (LOCA) in a Westinghouse ice condenser nuclear unit, similar to the Duke Power Company's McGuire units. The program is capable of evaluating (1) steady-state radial temperature distributions corresponding to fixed inside and outside temperatures, (2) radial temperature distributions in the steel containment shell and the concrete reactor (shield) building during the post-LOCA transient, (3) temperature and pressure in the annulus between the containment shell and reactor building during the post-LOCA transient, and (4) capability of the annulus ventilation fan to quickly attain and maintain a vacuum in the annulus after a LOCA occurs.(ERA citation 08:020665)...Software Description: GE635 MARK2 Time-Sharing System; FORTRAN IV; GE635 MARK 2 Time-Sharing System.

GENRD; Free-Format Card Input Processor.
C. W. Cox.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-530 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048530 Price code: CP T09

GENRD will read and process free-format numeric and Hollerith input data from cards. There is no provision for typing double precision, complex, or logical input. GENRD cannot recognize octal or other non-standard input forms. Hollerith information cannot be continued from one card to the next nor can it be contained within a repeat specification. (ERA citation 08:022842)...Software Description: CDC6600;IBM360; ANSI Standard FORTRAN; SCOPE 3 (CDC6600) and DOS (IBM360); 3000 decimal words of core, usual I/O, and one tape or disk unit.

CLEM; Angular Distribution Legendre Fitting.
C. J. Slavik, C. R. Lubitz, and J. T. Reynolds.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-531R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048531 Price code: CP T09

CLEM generates constrained Legendre moments for neutron scattering angular distributions. The constraint is that the angular distribution itself should be non-negative. (ERA citation 08:020547)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.2; 300K, usual I/O, and one tape unit.

LASL Group-Averaged Cross-Sections; SN 18- 24- and 25-Group Sets.
C. B. Mills.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-532 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048532 Price code: CP T15

Group constants and computed neutron cross sections are tabulated for a variety of materials including - Al, B, Be, C, Cd, Cl, D, Ga, F194, Fe, H, K, Li6, Mo, Na, Ni, O, Pu239, Pu240, Pu249, Th, U233, U235, U238, and Zr. These are presented as 18-, 24-, and 25-group calculations for reactors with neutron energies ranging from fast to thermal. (ERA citation 08:020548)...Software Description: CDC6600; FORTRAN IV; SCOPE.

ARC-NUI002 BCD Input Processor; BCD Input Data Processing Module.
E. A. Kovalsky, and B. J. Toppel.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-533 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048533 Price code: CP T14

The module ARC(NUI002) processes general neutronics input data sets for subsequent use by the neutronics-computational modules of the Argonne Reactor Computation (ARC) System. (ERA citation 08:020549)...Software Description: IBM360/50 and larger models; FORTRAN IV; OS/360 MVT; About 255K bytes are required with a 10,000 double-word container (default). One peripheral I/O device is required.

MULTI; Multi-Level Resonance Theory Cross-Section Calculations.
C. J. Slavik.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-535R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048535 Price code: CP T03

MULTI computes scattering cross sections. Only s-wave incident neutrons are allowed. (ERA citation 08:020550)...Software Description: CDC6600; FORTRAN IV; SCOPE; Input, output, and two tape units.

RAHAB Lattice Physics Modules; JOSHUA System Lattice Physics Modules.
H. C. Honeck.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-536 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048536 Price code: CP T15

RAHAB is a two-dimensional, multigroup, neutron integral transport code. Its capability includes full or subdivided annular, square and hexagon regions, clusters and multicell (mixed lattices). The multigroup structure can include thermal, epithermal, and fast energy regions. The number of energy groups is variable from 1 to 100. Buckling and time eigenvalue searches are allowed options. The code is restricted to 150 mesh points, 100 energy groups and 50 different isotopes. (ERA citation 08:020551)...Software Description: IBM360; FORTRAN IV; OS/360 and HASP; 260K bytes.

M0678;FUGIT1; Dynamic Response of Elastic Structures.
C. M. Friedrich.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-537R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048537 Price code: CP T09

FUGIT1 performs a transient step analysis of an elastic structure mounted on a rigid base which has a given shock history of motion. The structure may have nonlinear constraints and damping. 1 to 6 degrees of freedom in the base motion 1 to

30 rows and columns in the flexibility matrix 0 to 3 types of damping. (ERA citation 08:021437)...Software Description: CDC6600, FORTRAN IV; SCOPE; Input tape, output tape, 150,000 (octal) central memory, plot routines.

ETOG3; ENDF/B to MUFT, GAM, ANISN Cross-Section Format.
M. Raymund, D. E. Kusner, R. A. Dannels, and S. Kellman.
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Energy Systems Div. 1984, mag tape ANL/NESC-538 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048538 Price code: CP T16

ETOG3 processes basic nuclear information given in ENDF/B Version III format producing data decks for use in generation of MUFT4, MUFT5, GAM1, GAM2, and ANISN libraries. In addition to the restrictions on the ENDF/B data itself, ETOG3 has the following maxima - 99 multigroups 500 resolved resonances. (ERA citation 08:020552)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.0; 42,000 decimal locations and 4 scratch and punch units, 17,000 decimal locations of extended core memory.

STRAP; Static and Dynamic Structural Analysis.
J. A. Dearien, and E. D. Uldrich.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-539 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048539 Price code: CP T14

The code STRAP (STructural Analysis Package) was developed to analyze the response of structural systems to static and dynamic loading conditions. STRAP-S solves for the displacements and member forces of structural systems under static loads and temperature gradients. STRAP-D will solve numerically a given structural dynamics problem. STRAP-S maxima - 250 degrees of freedom 100 members STRAP-D maxima - 100 degrees of freedom 80 time-steps in the forcing function input. (ERA citation 08:021438)...Software Description: IBM360; FORTRAN IV; OS/360; 300K bytes of memory for each program plus 5 to 7 direct access storage devices besides standard I/O for STRAP-D.

PACTOLUS;CLOTHO; Nuclear Power Plant Cost Code.
D. R. Haffner.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-540 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048540 Price code: CP T12

PACTOLUS is a code for computing nuclear power costs using the discounted cash flow method. The cash flows are generated from input unit costs, time schedules and burnup data. CLOTHO calculates and communicates to PACTOLUS mass flow data to match a specified load factor history. Maxima of 40 annual time periods into which all costs and mass flows are accumulated 20 isotopic mass flows charged into and discharged from the reactor model. (ERA citation 08:020475)...Software Description: UNIVAC1108; FORTRAN V; CSCX; 65K memory with drum storage of input data to speed up processing.

WSP-HASP/DOS; DOS-MFT Remote Workstation Package.
R. J. McMahon.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-541 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048541 Price code: CP T09

The WSP (Work Station Package) is a modification of the standard HASP/RMT360 package supplied by IBM and runs on a multiprogrammed DOS System/360/30 using multi-leaving and binary synchronous communications to communicate with a System/360/195/ASP central CPU. (ERA citation 08:022843)...Software Description: IBM360; DOS Assembler language; 360 DOS Release 26.1. The ANL System/360/195 ASP central CPU is operating with Version 2.6.5 of ASP requiring no changes; WSP has been designed for a System/360/30 with an IBM 2540 reader-punch, two IBM 1403 printers, an IBM 1052 printer keyboard console, and an IBM 2701 data adapter unit.

PSA2; Stress Analysis Multianchor Pipe System.
A. N. Nickols.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-542 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048542 Price code: CP T09

PSA2 computes the reactions and stresses caused by thermal expansion and loads in a multi-anchor piping system which may contain loops and may be partially restrained at any point in any direction. Maximum of 36 sections. (ERA citation 08:020571)...Software Description: IBM360,370; FORTRAN IV (H); OS/360; 64K memory.

ENDF/B-THERMOS; 30-Group ENDF/B Scattering Kernels.
F. J. McCrosson, and D. R. Finch.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-543 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048543 Price code: CP T14

These data are 30-group THERMOS thermal scattering kernels for P0 to P5 Legendre orders for every temperature of every material from s(alpha,beta) data stored in the ENDF/B library. These scattering kernels were generated using the FLANGE2 computer code. To test the kernels, the integral properties of each set of kernels were determined by a precision integration of the diffusion length equation and compared to experimental measurements of these properties. In general, the agreement was very good. Details of the methods used and results obtained are contained in the reference. The scattering kernels are organized into a two volume magnetic tape library from which they may be retrieved easily for use in any 30-group THERMOS library. The contents of the tapes are as follows - VOLUME I Material ZA Temperatures (degrees K) Molecular H2O 100.0 296, 350, 400, 450, 500, 600, 800, 1000 Molecular D2O 101.0 296, 350, 400, 450, 500, 600, 800, 1000 Graphite 6000.0 296, 400, 500, 600, 700, 800, 1000, 1200, 1600, 2000 Polyethylene 205.0 296, 350 Benzene 106.0 296, 350, 400, 450, 500, 600, 800, 1000 VOLUME II Material ZA Temperatures (degrees K) Zr bound in ZrHx

203.0 296, 400, 500, 600, 700, 800, 1000, 1200 H bound in ZrHx 230.0 296, 400, 500, 600, 700, 800, 1000, 1200 Beryllium-9 4009.0 296, 400, 500, 600, 700, 800, 1000, 1200 Beryllium Oxide 200.0 296, 400, 500, 600, 700, 800, 1000, 1200 Uranium Dioxide 207.0 296, 400, 500, 600, 700, 800, 1000, 1200Auxiliary program written in FORTRAN IV; The retrieval program requires 1 tape drive and a small amount of high-speed core. (ERA citation 08:022506)...Software Description: IBM360/65; FORTRAN IV; OS/360.

PLOT-3D; Three-Dimensional Plots on IBM2280 or CalComp780.
D. Basinger, and J. Gvildys.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-544 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048544 Price code: CP T09

PLOT-3D is a package of subprograms designed to draw three-dimensional surfaces from arrays of points (x,y,z). The surfaces can be drawn after arbitrary rotations about the three coordinate axes. Versions 3 and 4 limit number of rows in arrays (x,y,z) to 100 and also number of columns in arrays (x,y,z) to 100. (ERA citation 08:020666)...Software Description: IBM360/75 with an IBM2280 film recorder or a CalComp 780 plotter; FORTRAN IV; OS/360 ASP; Versions 1 and 3, for the IBM 2280 film recorder, require 7810 and 58,285 bytes of core storage, exclusive of film recorder subroutines and arrays. Versions 2 and 4, for the CalComp plotter, require 6670 and 62,435 bytes of core storage, exclusive of CalComp plotter subroutines and arrays.

BETTY; Entrained Particles Sampling Study.
S. K. Beal.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-545-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048545 Price code: CP T03

BETTY describes spatial and temporal concentration behavior of a suspension in a pipe, as a result of deposition and erosion of the particles. No more than 900 axial increments may be used. (ERA citation 08:027364)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.2; 63K 60-bit words of core storage.

EMERALD REVISION 1; PWR Accident Activity Release.
W. K. Brunot, R. R. Fray, and S. G. Gillespie.
Pacific Gas and Electric Co., San Francisco, CA. Dept. of Mechanical and Nuclear Engineering. 1984, mag tape ANL/NESC-546 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048546 Price code: CP T13

The EMERALD program is designed for the calculation of radiation releases and exposures resulting from abnormal operation of a large pressurized water reactor (PWR). The approach used in EMERALD is similar to an analog simulation of a real system. Each component or volume in the plant which contains a radioactive material is represented by a subroutine which keeps track of the production, transfer, decay and absorption of radioactivity in that volume. During the course of the analysis of an accident, activity is transferred from subroutine to subroutine in the program as it would be transferred from place to place in the plant. For example, in the calculation of the doses resulting from a loss-of-coolant accident the program first calculates the activity built up in the fuel before the accident, then releases some of this activity to the containment volume. Some of this activity is then released to the atmosphere. The rates of transfer, leakage, production, cleanup, decay, and release are read in as input to the program. Subroutines are also included which calculate the on-site and off-site radiation exposures at various distances for individual isotopes and sums of isotopes. The program contains a library of physical data for the twenty-five isotopes of most interest in licensing calculations, and other isotopes can be added or substituted. Because of the flexible nature of the simulation approach, the EMERALD program can be used for most calculations involving the production and release of radioactive materials during abnormal operation of a PWR. These include design, operational, and licensing studies. Maxima of 25 isotopes 7 time periods 15 volumes or components 10 distances. (ERA citation 08:027421)...Software Description: IBM360,370; FORTRAN IV; OS/360,370 (IBM360,370); 520K bytes of memory are required.

GAMB1T; Cross Section Generation for Transport Codes.
G. Gibson, and G. Collier.
Westinghouse Electric Corp., Waltz Mill, PA. Advanced Reactors Div. 1984, mag tape ANL/NESC-547 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048547 Price code: CP T16

GAMB1T is a program that was designed to calculate multigroup neutron cross sections in the high energy and the thermal energy ranges. It was created by joining GAM, which does the high energy calculation, and B1T, which does the thermal calculation. Maxima of 20 nuclides per problem 32 GAM (fast) broad energy groups 48 BIT (thermal) broad energy groups. (ERA citation 08:028142)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.0; 64K memory and 8 tapes.

CEBUG; Steam Generator Sodium-Water Reaction.
P. K. Doherty, and D. W. Stuteville.
Combustion Engineering, Inc., Windsor, CT. 1984, mag tape ANL/NESC-548 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048548 Price code: CP T09

The transient hydraulic behavior of the sodium in a sodium-heated steam generator in which a sodium-water reaction occurs due to a large water leak is calculated for flows in up to three dimensions. Maxima of 140 elements in 3-D region (including transition elements) 30 channels 30 channel nodes 5 transition elements 1 cover gas space 28 connections to finite elements for each transition element 4 connections to channels for each transition element 200 time-steps saved on plot output array in general. (ERA citation 08:026242)...Software Description: CDC6400,6600,7600; ANSI FORTRAN IV; SCOPE 3.3 (CDC6400,6600), SCOPE 2.0 (CDC7600); 21,000 word memory (CDC6400,6600), 17,000 word memory.

REXCO-H (Release 1); Two-Dimensional Hydrodynamic Response to Excursion.
Y. W. Chang, J. Gvildys, and S. H. Fistedis.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-550 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048550 Price code: CP T11

REXCO-H calculates the two-dimensional hydrodynamic response of primary reactor containment to a high-energy excursion. To execute the pictorial display, the program uses the ANL system installation subroutines described in ANL-AMD Technical Memorandum No. 167, A Film-Plotting Subroutine Package (FSP) for the 2280 Film Recorder, by D. Carson, June 17, 1968, and to execute the CalComp plots, the program uses the subroutines described in ANL-AMD Technical Memorandum No. 130, S/360 Programming Techniques for the CalComp 780, by R. F. Krupp, January 6, 1967; 500K bytes of core, two 9-track tape units, one 7-track tape unit, IBM 2280 film recorder, CalComp 780 plotter. Maxima of 3000 grid zones 1000 cycles per run, if CalComp display is required 20 materials 20 sections 10 reactor vessels 50 points for stress-strain table for reactor material. (ERA citation 08:026243)...Software Description: IBM 360/195; FORTRAN IV; 500K memory.

MOXY/MOD032; BWR Core Heat Transfer Code.
D. R. Evans.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-551 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048551 Price code: CP T18

MOXY is used for the thermal analysis of a planar section of a boiling water reactor (BWR) fuel element during a loss-of-coolant accident (LOCA). The code employs models that describe heat transfer by conduction, convection, and thermal radiation, and heat generation by metal-water reaction and fission product decay. Models are included for considering fuel-rod swelling and rupture, energy transport across the fuel-to-cladding gap, and the thermal response of the canister. MOXY requires that time-dependent data during the blowdown process for the power normalized to the steady-state power, for the heat-transfer coefficient, and for the fluid temperature be provided as input. Internal models provide these parameters during the heatup and emergency cooling phases. Maxima of 10 time-step sets 10 print-interval sets 50 normalized power-time pairs in considering time-dependent heat source 50 convection heat transfer coefficient-time pairs in considering time-dependent convection 50 fluid temperature. (ERA citation 08:026244)...Software Description: IBM360;CDC7600; FORTRAN IV and Assembly language (IBM360), FORTRAN IV and COMPASS (CDC7600); OS/360 (IBM360) and SCOPE 2.1 (CDC7600); 300K bytes of storage (IBM360) or 110,000 (octal) words of small core memory (SCM) (CDC7600), standard input/output units, and 5 other units are required.

PWR-PPM; Boration-Dilution Tables for PWR Operation.
R. L. Jaworski, and V. I. Swisher.
Omaha Public Power District, NE. 1984, mag tape ANL/NESC-552 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048552 Price code: CP T03

PWR-PPM generates boration-dilution tables used by the reactor operator of a PWR. The computer printed tables plot initial and final reactor coolant system boron concentration in units of ppm boron against the gallons of makeup water and boric acid solution required to obtain the desired ppm change. These tables replace nomographs normally required for boration and dilution operations. The temperature between and including 100 to 600 degrees F and the pressure between and including 200 psig to 6000 psig. (ERA citation 08:026034)...Software Description: CDC6000 series; FORTRAN IV; KRONOS SCOPE 3.3.

U3R; Unresolved Resonance Cross Section Probability Tables.
J. M. Otter, R. C. Lewis, and L. B. Levitt.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-553 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048553 Price code: CP T11

U3R numerically constructs a table of the cumulative probability distribution functions of unresolved resonance cross sections in a narrow energy range. Maxima of 20 unresolved resonance (l,j) series 4 temperatures 100 ladders unlimited energies ′ 99 as the table length. (ERA citation 08:026136)...Software Description: IBM360,370; FORTRAN IV, Assembly language random number generator; OS/360; 470K memory (double precision).

DISPER1; Aerosol Particle Transport Study.
N. A. Frigerio, R. S. Stowe, and N. A. Clark.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-554 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048554 Price code: CP T03

DISPER1 determines the aerosol particle source strength outside an enclosure due to a release of aerosol particles within the enclosure. The release is assumed to pressurize the enclosure and the airborne particles are carried by the escaping gas into leak paths in the enclosure walls. Here they may be deposited on the leak path walls or remain entrained and escape from the enclosure. Maximum of 20 leakage path sets. (ERA citation 08:027365)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; Execution of the sample problem required 48K bytes.

PARET; Water-Cooled Core Transient Analysis.
P. D. Adolf.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-555 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048555 Price code: CP T14

This program is designed for use in predicting the course and consequences of nondestructive reactivity accidents in small reactor cores. The PARET model is subject to several recognized limitations which may limit the applicability in any specif-

ic situation, depending on the nature of the transient under consideration. The code employs steady-state heat transfer correlations throughout, possibly being unrealistic in certain transient situations. (ERA citations 08:026245)...Software Description: IBM360,370,303x; FORTRAN IV (90%) and BAL (10%); OS/360; 240K bytes plus one magnetic tape.

KEELE; Linearly-Constrained Optimization.
G. W. Westley.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-556 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048556 Price code: CP T09

KEELE is a linearly constrained nonlinear programming algorithm for locating a local minimum of a function of n variables with the variables subject to linear equality and/or inequality constraints. Array dimensions limit the number of variables to 20 and the number of constraints to 50. These can be changed by the user. (ERA citation 08:028650)...Software Description: IBM360; FORTRAN IV; OS/360; 31K bytes.

SHLOG; Data Management, Editing, and Analysis.
H. Bohl, Jr.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-557-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048557 Price code: CP T14

SHLOG provides general-purpose data manipulation functions for data analysis. These functions include creating, maintaining, and storing files, displaying the contents of a file via either the line printer or an on-line plotter, searching for data points by comparing values with specified criteria, and performing certain statistical operations on the data points. (ERA citation 08:028777)...Software Description: CDC6600; FORTRAN IV and COMPASS; SCOPE 3.1; 100,000 (octal) central memory, input/output via magnetic tape or disk, MAP output on line printer or microfilm device, graphs on microfilm device.

TASK; One-Dimensional Multigroup Reactor Kinetics Program.
A. R. Buhl, O. W. Hermann, R. J. Hinton, H. L. Dodds, Jr., and J. C. Robinson.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-558 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048558 Price code: CP T12

TASK solves the one-dimensional multigroup form of the reactor kinetics equations, using either transport or diffusion theory and allowing an arbitrary number of delayed neutron groups. The program can also be used to solve standard static problems efficiently such as eigenvalue problems, distributed source problems, and boundary source problems. Convergence problems associated with sources in highly multiplicative media are circumvented, and such problems are readily calculable. The principal restrictions are available storage and computation time. Since the code is flexibly-dimensioned and has an outer iteration option there are no internal restrictions on group structure, quadrature, and number of ordinates. The flexible-dimensioning scheme allows optional use of core storage. (ERA citation 08:026137)...Software Description: IBM360; FORTRAN IV; OS/360; TASK requires 154K bytes of storage plus data block storage and 1 tape if using the flux tape option.

SOFIRE2 1- and 2-CELL; Sodium Pool Fire 1- and 2-Cell Analysis.
M. Silberberg.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-559 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048559 Price code: CP T09

SOFIRE2 ONE CELL, calculates the consequences of a sodium pool fire in a closed vault. Gas pressure in the vault is calculated from the gas density and temperature. SOFIRE2 TWO CELL, calculates the consequences of a sodium pool fire in a vault connected to a containment structure through a restricted opening. Cold gas flows from the containment to the vault due to mass differences while hot gas flows from the vault to the containment to equilibrate pressures. Pressure in the containment is calculated from the gas density and temperature. In both programs the sodium burning rate is governed by the rate of oxygen diffusion to the sodium surface. The ONE CELL program has a total of 12 nodes available for system components, while the TWO CELL program has a total of 16 nodes. (ERA citation 08:026246)...Software Description: IBM360; FORTRAN IV; OS/360; 134K bytes (ONE CELL program), 148K bytes (TWO CELL program).

HYMAS; Hydrodynamic Mass Matrix Generation.
G. R. Sharp, and W. A. Wenzel.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-560-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048560 Price code: CP T09

HYMAS generates the hydrodynamic mass matrix per unit depth associated with a multi-mass system immersed in a liquid environment. It is assumed that the liquid environment may be represented by a series of flow-channels and nodes. Flow-channels are introduced in the region between surfaces of neighboring solids, and nodes are used to connect two or more flow-channels. Also, it is assumed that the solid bodies undergo unidirectional motion, that potential flow theory is applicable, that the width of a flow-channel is small compared with the length so there is no pressure drop across the flow-channel, and that nodal volume is small compared with flow-channel volume. The number of subdivisions in a flow-channel is limited to 50. (ERA citation 08:027473)...Software Description: CDC6600; FORTRAN IV and COMPASS; SCOPE 3.1.5; 30000 (octal) of fast memory, plus extended core storage.

TOKMINA;TOKMINA2; Tokamak Fusion Reactor Study.
A. J. Hatch.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-561 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048561 Price code: CP T03

TOKMINA finds the minimum magnetic field, Bm, required at the toroidal coil of a Tokamak type fusion reactor when the

input is beta(ratio of plasma pressure to magnetic pressure), q(Kruskal-Shafranov plasma stability factor), and y(ratio of plasma radius to vacuum wall radius: rp/rw) and arrays of PT(total thermal power from both d-t and tritium breeding reactions), Pw(wall loading or power flux) and TB(thickness of blanket), following the method of Golovin, et al. TOKMINA2 finds the total power, PT, of such a fusion reactor, given a specified magnetic field, Bm, at the toroidal coil. Input arrays presently are dimensioned at 20. This restriction can be overcome by changing a dimension card. (ERA citation 08; 028574)...Software Description: IBM360; FORTRAN IV; OS/360; 160K bytes of core.

AMDLIBAE; Argonne Subroutine Library Categories A-E.
J. Y. Wang.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-562 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048562 Price code: CP T15

AMDLIBAE is a subset of the IBM 360 Subroutine Library at the Applied Mathematics Division at Argonne National Laboratory. This subset includes library categories A-E. (ERA citation 08:028651)...Software description: IBM360; Assembly language, FORTRAN IV, and PL/T.

AMDLIBF; Argonne Subroutine Library Category F.
J. Y. Wang.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-563 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048563 Price code: CP T11

AMDLIBF is a subset of the IBM 360 Subroutine Library at the Applied Mathematics Division at Argonne. This subset includes library category F: IDENTIFICATION DESCRIPTION F152S F SYMINV Invert sym. matrices, solve lin. systems F154S A DOTP Double plus precision accum. inner prod. F156S F RAYCOR Rayleigh corrections for eigenvalues F161S F XTRADP A fast extended precision inner product F162S A XTRADP Inner product of two DP real vectors F202S F1 EIGEN Eigensystem for real symmetric matrix F203S F Driver for F202S F248S F RITZIT Largest eigenval. and vec. real sym. matrix F261S F EIGINV Inverse eigenvalue problem F313S F CQZHES Reduce cmplx matrices to upper Hess and tri F314S F CQZVAL Reduce complex matrix to upper Hess. form F315S F CQZVEC Eigenvectors of cmplx upper triang. syst. F316S F CGG Driver for complex general eigenproblem F402S F MATINV Matrix inversion and sol. of linear eqns. F403S F Driver for F402S F452S F CHOLLU,CHOLEQ Sym. decomp. of pos. def. band matrices F453S F MATINC Inversion of complex matrices F454S F CROUT Solution of simultaneous linear equations F455S F CROUTC Sol. of simultaneous complex linear eqns. F456S F1 DIAG Integer preserving Gaussian elimination. (ERA citation 08:028652)...Software Description: IBM360/75; Assembly language and FORTRAN IV each indicated by A or F in the identification given in the DESCRIPTION.

AMDLIBGZ; Argonne Subroutine Library Categories G-Z.
J. Y. Wang.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-564 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048564 Price code: CP T11

AMDLIBGZ is a subset of the IBM 360 Subroutine Library at the Applied Mathematics Division at Argonne National Laboratory. This subset includes library categories G-Z: IDENTIFICATION DESCRIPTION G552S F RANF Random number generator J952S F YOLYPLOT CalComp plots J955S P GRAF Prints a graph of points on line printer K250S A1 Core to core conversion K251S A HEXINP Hexadecimal input for PL/I programs K252S A HEXOUT Hexadecimal output conv. PL/I programs M101S F SORT Algebraic sort M150S F CSORT Algebraic sort M151S P2 ANLKWIC KWIC sort M250S A SMALLIST Squeezes assembler listing to 8 x 11 N251S A ABEND Calls ABEND dump Q052S A CLOCK Time Q053S A COPYAGO Copy load module from tape to disk Q054S A DATE Current date in form MM/DD/YY Q055S A TIME Time (24 hour clock) in EBCDIC HH.MM.SS Z013S F Variable metric minimization Z057S A LOCF Locate machine addresses of variables Z071S A ALLOC Allocate LCS for FORTRAN programs Z074S A ANLMNP Exponent and mantissa manipulative functs. (ERA citation 08:028653)...Software Description: IBM360/75; Assembly language, FORTRAN IV, and PL/I each indicated by A, F or P in the identification given in the description above.

INCITE; Thermal Spectra and Multi-Group Constants.
R. L. Curtis, and R. A. Grimesey.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-565 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048565 Price code: CP T17

INCITE generates energy-dependent thermal neutron spectra and appropriate average multigroup cross sections using arbitrary scattering kernels. The physical model is a homogeneous, critical, one-dimensional base slab core. A maximum of 101 fine energy points and 50 broad groups is permitted. A library tape containing the appropriate absorption and scattering cross sections at these energy points is required. (ERA citation 08:026138)...Software Description: IBM360; FORTRAN IV; OS/360; Approximately 300K bytes of core memory, one cross section library tape, and three I/O scratch units are required for execution.

RESPOND; Dissimilar Media TLD Correction Calculations.
R. J. Tuttle.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-566 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048566 Price code: CP T03

RESPOND calculates the relative energy absorption of a small region of one material in a large body of another material exposed to gamma- or x-radiation. The energy division is into 100 equal intervals. Only 2 regions may be specified. (ERA citation 08:027227)...Software Description: IBM360,370; FORTRAN IV (H); OS/360; 84K memory.

3DB; Three-Dimensional Multigroup Diffusion Burnup Analysis.
R. W. Hardie, W. W. Little, Jr., and W. Mroz.

Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-567 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048567 Price code: CP T11

3DB is a three-dimensional (x-y-z, r-theta-z, triangular-z) multigroup diffusion code for use in detailed fast-reactor criticality and burnup analysis. The code can be used to - (a) compute keff and perform criticality searches on time absorption, reactor composition, and reactor dimensions by means of either a flux or an adjoint model, (b) compute material burnup using a flexible material shuffling scheme, and (c) compute flux distributions for an arbitrary extraneous source. Since variable dimensioning is employed, no simple bounds can be stated. (ERA citation 08:026139)...Software Description: UNIVAC1108;IBM360; FORTRAN IV; EXEC8 (UNIVAC1108), OS/360 (IBM360); 65K word memory and 11 peripheral storage devices (UNIVAC1108). 500K bytes and same number of mass storage units.

BEHAVE2; Oxide Fuel Performance Finite-Element.
S. Oldberg, Jr.
General Electric Co., Sunnyvale, CA. Breeder Reactor Dept. 1984, mag tape ANL/NESC-568-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048568 Price code: CP T12

BEHAVE2 calculates the position in space of cladding, fuel, and voidage in an operating oxide fuel pin with unfailed cladding. Axial symmetry is assumed throughout the program. Also calculated are stress, strain, displacement, and temperature fields. Influential processes simulated include cracking of fuel, dilatation of fuel and cladding due to irradiation effects and thermal expansion, fuel densification by both stress- and diffusion-controlled processes, axial slippage or locking at the fuel-cladding interface and axial flow of fuel. Maxima of cladding divided radially into 10 rings, outer (structural) fuel zone divided radially into 10 rings, middle (nontransport) fuel region divided radially into 10 rings, inner (transport) fuel region divided into 10 rings, fuel and cladding divided axially into 5 sections. (ERA citation 08:026197)...Software Description: GE635; FORTRAN IV; GECOS III, SAL-3; 41K fast memory.

VIEWPIN; View Factor Calculations for Cylindrical Pins.
G. L. Singer.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-569 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048569 Price code: CP T09

The program calculates view factors for cylindrical pins whenever the problem can be represented two-dimensionally. The length of the cylindrical pins of the physical problem must be much greater than the diameter of any of the pins. (ERA citation 08:026198)...Software Description: IBM360; FORTRAN IV; OS/360; 50K bytes.

STRIPE;M0650; Fuel Rod Clad Strain and Pellet Cracking.
W. J. O'Donnell, W. G. Clarke, and W. R. Campbell.
O'Donnell and Associates, Inc., Pittsburgh, PA. 1984, mag tape ANL/NESC-570-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048570 Price code: CP T09

STRIPE examines the deformations imposed on the cladding of cylindrical fuel elements due to differential thermal expansions during abrupt power increases. The title is taken from stresses and cracking in pellets. The calculational model includes effects of pellet cracking, the constraint of system pressure and cladding, compressive plastic flow in the fuel and the temperature dependence of material properties. Maxima of 100 radial sections in the fuel for the computing grid; 50 radial sections in the clad for the computing grid. Elastic-perfectly plastic properties are used for both the pellet and clad. (ERA citation 08:026199)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1; 45,000 octal locations of central memory.

CHECK3;RIGEL3 ENDF/B V3 Data Processing Codes.
O. Ozer, and E. M. Pennington.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-571 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048571 Price code: CP T12

These programs are used to process ENDF/B Version III data. In addition, the CDC6600 programs will process ENDF/B Version IV data. CHECK3 checks that the ENDF/B tapes are in proper format and all fields are within specified limits, rather than the physics of the data library. Angular distributions reconstructed from Legendre coefficients are everywhere positive. RIGEL3 will perform any or all of the following operations - selectively retrieve ENDF/B data on from 1 to 9 ENDF/B tapes, merge retrieved ENDF/B data onto from 1 to 8 ENDF/B result tapes, change tape arrangement (from standard to alternate or vice-versa) and change tape mode. In CHECK3 correct structure of the data tape is assumed and minor anomalies are noted. Common and major irregularities cause termination of execution accompanied by a core dump. (ERA citation 08:026140)...Software Description: CDC6600;IBM360; FORTRAN IV; SCOPE (CDC6600), OS/360 (IBM360); 2 scratch devices for CHECK3.

TWOTRAN-PNVW; Two-Dimensional Particle Transport X-Y R-Z R-theta.
K. D. Lathrop, and F. W. Brinkley.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-573 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048573 Price code: CP T12

TWOTRAN-PNVW solves two-dimensional particle transport problems for x-y, r-z, and r-theta geometries. Both direct and adjoint, homogeneous (keff or parametric eigenvalue searches) or inhomogeneous time-independent problems are solved subject to vacuum, reflective, periodic or input specification of boundary flux conditions. Both anisotropic inhomogeneous problems and general anisotropic scattering problems are treated. The variable-dimensioning capability of FORTRAN IV is used so that any combination of problem parameters leading to a common vector length less than MAXLEN can be used. MAXLEN is slightly greater than 40,000 words for the CDC7600. With a few exceptions only

within-group problem data are stored in fast memory. (ERA citation 08:026141)...Software Description: CDC6600,7600; FORTRAN IV; CROS; 5 output units (disk, drums or tapes) in addition to 2 system input/output units, a CDC Extended Core Storage unit or a large bulk memory (disk, drums or tapes can be substituted for this requirement).

MACS LATTICE VIBRATION CODES; MACS Lattice Vibration Neutron Scattering Codes.
H. L. McMurry, W. J. Suitt, T. G. Worlton, and R. M. Martin.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-574 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048574 Price code: CP T13

This package of seven related codes is basically aimed at giving maximum capability for calculating slow-neutron scattering by moderators. MACS-C computes crystal vibrations when the potential energy is a sum of parts arising from short-range forces and long-range Coulomb interactions. It also obtains Jacobian matrices for determining adjustments in force constants and ionic charge which can lead to improved agreement with data. Structure factors for neutron inelastic scattering can also be calculated. MACS-J computes the dynamical matrix for the harmonic oscillations of a crystal, its eigenvalues and eigenvectors, the corresponding structure factors for coherent single-phonon scattering of neutrons, and Jacobian matrices for use in adjusting force constants to fit calculated to observed dispersion curves. REVISED-D calculates valance coordinates in terms of mass adjusted atom displacements, together with coordinates which define rigid group rotations. REVISED-MVFC constructs force constant matrices for use in valance force potential functions which are used in other programs dealing with molecular and crystal vibrations. ADJUSTER is a force adjuster program to obtain a least squares fit to observed frequencies of molecules and crystals. DIPOLE-SUM calculates dipole sums for an arbitrary crystal. MODEL-PI calculates crystal vibrations when the potential energy is a sum of short-range and long- or intermediate-range terms in the dipole coordinate approximation. It also obtains Jacobian matrices for use in adjusting input parameters. For all codes which produce eigenvectors, nearly equal eigenvalues can be encountered, in which case the basis vectors for the corresponding vector subspace are not uniquely determined. In MACS-C, the largest Jacobian matrix which can be computed is 40 x 15. The largest force constant vector applied is of dimension 15. (ERA citation 08:026142)...Software Description: IBM360; FORTRAN IV; OS/360; 650K bytes of core are required for each of the programs.

MSCAT; Slow Neutron Multiple Scattering Calculations.
J. R. D. Copley.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-575 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048575 Price code: CP T12

In a thermal neutron scattering experiment, the measured cross section includes both single and multiple scattering events. In order to extract the single scattering cross section, the cross section for multiple scattering must be known. Since this contribution is generally a smoother function of angle and scattered energy than the single scattering, it is less sensitive to details of the single scattering cross sections. It is, therefore, feasible to calculate the multiple scattering using an approximate scattering function and to subtract it from the measurements in order to obtain the single scattering. MSCAT calculates the single and multiple scattering cross sections for a specified experimental situation, given a single scattering function as input. Apart from space and time limitations, the program is limited to three target geometries and to no more than 8 scattering angles. These and other less significant restrictions may be removed by suitably modifying the program. The sample and the sample container must be isotropic materials. (ERA citation 08:026143)...Software Description: IBM360,370,303x; FORTRAN IV; OS/360; Normal I/O devices plus disk storage of up to 3 files written by the program and a main storage requirement of 51,000 words.

GEM; Analysis of Nuclear Fuel Cycle Economics.
J. A. Hughes, and D. F. Hang.
Illinois Univ. at Urbana-Champaign. Nuclear Engineering Lab. 1984, mag tape ANL/NESC-576 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048576 Price code: CP T12

GEM is used to predict fuel cycle costs for any type nuclear system (i.e., BWR, HTGR, PWR, LMFBR, GCFR, . . .). The current version is limited to thermal reactors. GEM is designed for production use by large utilities which have several reactor types on their system. GEM has been written so as to accommodate all major fuel management activities undertaken by a utility - (1) fuel bid analysis, (2) evaluation of actual day to day operation, and (3) system simulation and optimization studies. Dimensions of all arrays are carried as variables throughout the analysis. The maximum size of each array is set by the user in program MAIN. Current values are set so that maxima are - 50 batches per case study 20 year batch life 30 year case study 120 batch burn time-steps 20 individual payments (sales) associated with each cost component. (ERA citation 08:026121)...Software Description: IBM360; FORTRAN IV; OS/360; 274K bytes (202K with overlay structure) and one non-system disk.

FFEARS; Laplace Equation Isotropic Dielectrics.
J. E. Boers, and H. E. Edwards.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-577 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048577 Price code: CP T09

FFEARS is generally applicable for the solution of boundary value problems involving the Laplace equation using difference equations in axisymmetric or rectangular coordinates. It will handle virtually any configuration of dielectrics and floating electrodes, producing both equipotential and equifield plots, if desired. The program treats any rectangular or axisymmetric configuration of dielectrics and small floating electrodes that can be described by a matrix of up to 201 x 201 points. All electrode and dielectic surfaces must lie on matrix points. (ERA citation 08:028654)...Software Description: CDC6600,7600; IBM360,370; FORTRAN IV; SCOPE 3.3 (CDC6600), SCOPE 2.1 (CDC7600), OS/360 (IBM360), OS/370 (IBM370); The CDC6600 version requires 122,000 (octal) words of memory, 12 files on disk storage, and a SC-4020

plotter. The IBM360 version requires 350K bytes to compile, 288K bytes to execute, 11 files on disk storage, and a CalComp plotter.

PLOTR; Two-Dimensional Contour Plots and Area Calculation.
S. M. Davenport.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-578-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048578 Price code: CP T09

PLOTR and the auxiliary routine XYGRD contour a function defined over a two-dimensional grid and compute the area within the contours. The maximum allowable range between minimum and maximum angles is 180 degrees. (ERA citation 08:027346)...Software Description: CDC6600; FORTRAN IV.

DWARF; One-Dimensional Few-Group Diffusion Depletion Program.
E. C. Anderson, and G. E. Putnam.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-579 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048579 Price code: CP T14

DWARF allows one-dimensional simulation of reactor burnup and xenon oscillation problems in slab, cylindrical, or spherical geometry using a few-group diffusion theory model. Maxima of 4 groups 40 regions 50 macroscopic materials* 50 nuclides per region 250 mesh points * Only 10 are functions of the feedback variables. (ERA citation 08:026144)...Software Description: IBM360; FORTRAN IV (H); OS/360; 330K bytes of core storage plus 8 FORTRAN logical units, including units for card input, printed output, and plotted output.

ASTEM; Thermodynamic Properties Water and Steam.
K. V. Moore, M. P. Burgess, G. L. Fuller, A. H. Kaiser, and D. L. Jaeger.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-580 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048580 Price code: CP T09

ASTEM is a modular set of FORTRAN IV subroutines to evaluate the Gibbs, Helmholtz, and saturation line functions as published by the American Society of Mechanical Engineers (1967). Any thermodynamic quantity including derivative properties can be obtained from these routines by a user-supplied main program. PROPS is an auxiliary routine available for the IBM360 version which makes it easier to apply the ASTEM routines to power station models. Unless redimensioned highest derivative is order 9. One-dimensional arrays save storage area. (ERA citation 08:026145)...Software Description: IBM360,370/195;CDC6600,7600; FORTRAN IV; OS/360,370 (IBM360,370), SCOPE (CDC6600,7600); 68K bytes (IBM370/195), 21,000 (octal) words (CDC6600,7600). When using PROPS, 90K bytes of memory is required on the IBM system.

SLADE-D; Dynamic Analysis of Thin Shells.
S. W. Key, and Z. E. Beisinger.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-581 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048581 Price code: CP T11

SLADE-D analyzes the transient dynamic response of elastic shells. Maxima of 650 elements 700 nodal points. (ERA citation 08:028655)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.2; 79,000 (decimal) words of core, extended core storage, and mass storage disk files.

MONA; One-Dimensional Multigroup Diffusion in Slab, Cylindrical, and Spherical Geometry.
G. E. Putnam.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-582 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048582 Price code: CP T14

MONA solves the multigroup, one-dimensional neutron diffusion equations in slab, cylindrical, or spherical geometry for either the direct or adjoint flux. Boundary sources and spatially dependent volume sources can be group dependent. Multiple thermal groups are allowed. Maxima of 50 groups 50 regions 20 macroscopic materials 999 library materials 500 mesh points. (ERA citation 08:026146)...Software Description: IBM360; FORTRAN IV (H); OS/360; 300K bytes of core storage, 5 FORTRAN logical units for program-required data sets, 3 FORTRAN logical units for card input, printed output, and punched card output.

STEFEG; Analysis of PWR and BWR Gaseous Release.
F. T. Binford, T. P. Hamrick, G. W. Parker, and T. H. Row.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-583 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048583 Price code: CP T09

STEFEG calculates gaseous source terms. It computes the gaseous releases through various paths from boiling water reactors and/or pressurized water reactors. 20 isotopes, and 6 reports each for pressurized water reactor and boiling water reactor. (ERA citation 08:026222)...Software Description: IBM360; FORTRAN IV; OS/360.

FPFM; Steady-State Fission Product Fuel Model.
V. F. Baston.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-584 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048584 Price code: CP T09

FPFM is used in radiological safety analyses of line reactors (BWR's and PWR's only) to calculate: (1) maximum noble gas release to the fuel cladding gap for total core during steady-state operation, (2) noble gas released to the reactor primary system for selected pin perforations, and (3) internal pin pressure (optional). FPFM applies only to water-cooled reactors. (ERA citation 08:026223)...Software Description: IBM360; FORTRAN IV; OS/360; 70K storage single-precision.

TRIAL; Three-Dimensional Reaction Rates from Two-Dimensional Flux Sets.
C. L. Cowan.
General Electric Co., Sunnyvale, CA. Breeder Reactor Dept. 1984, mag tape ANL/NESC-585 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048585 Price code: CP T09

TRIAL carries out a simple linking of several two-dimensional, multigroup neutron (direct or adjoint) flux sets to give a three-dimensional representation. A maximum of 25 two-dimensional flux sets may be input to TRIAL. Otherwise, variable-dimensioned arrays are used exclusively within the program and problem size limitations will be dictated by the amount of available computer memory. (ERA citation 08:026065)...Software Description: Honeywell6000; FORTRAN IV; GCOS6000; 32K memory, a minimum of 4 logical units for the peripheral storage of input, working, and output flux sets, plus an additional logical unit for each additional input (x,y) flux set greater than one.

PLENUM; Flow Distribution in Cylindrical Coolant Inlet Plenum.
S. D. Harris.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-586 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048586 Price code: CP T09

Bulk flow distribution in a cylindrical reactor coolant inlet plenum is calculated using potential flow theory. The code is dimensioned for 8000 mesh points in an (r,theta,z) array. Dimensions can be expanded at the expense of run time and core size. (ERA citation 08:026147)...Software Description: IBM360; FORTRAN IV; OS/360; 240K bytes of storage and an on-line punch and printer.

AEC-ALO FAU; Radio Frequency Management System.
J. H. Grayson, G. S. Hearron, and G. Kojima.
Department of Energy, Albuquerque, NM. Albuquerque Operations Office. 1984, mag tape ANL/NESC-587 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048587 Price code: CP T09

The AEC-ALO Radio Frequency Assignments and Uses program (FAU) provides for maintaining radio frequency assignment and transaction records. It lists all radio frequency assignments and uses from initial application (AEC-310) through authorizations (IRAC docket). The program allows for sorting by office, system number, location, frequency, expiration date, ALO or AEC serial number, and IRAC docket number. (ERA citation 08:028642)...Software Description: IBM360/50; COBOL; OS/360; This system requires disk-sort of input data and the master tape records. Peripheral equipment required is card reader, line printer (132 character/line), and two magnetic tape units.

ORCOST2; Power Plant Capital Cost Estimating.
L. C. Fuller, and M. L. Myers.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-588 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048588 Price code: CP T11

ORCOST2 estimates the cost of electrical energy production from single-unit steam-electric power plants. Capital costs and operating and maintenance costs are calculated using base cost models which are included in the program for each of the following types of plants: PWR, BWR, HTGR, coal, oil, and gas. The user may select one of seven input/output options for calculation of capital cost, operating and maintenance cost, levelized energy costs, fixed charge rate, annual cash flows, cumulative cash flows, and cumulative discounted cash flows. Options include the input of capital cost and/or fixed charge rate to override the normal calculations. Transmission and distribution costs are not included. Fuel costs must be input by the user. The capital cost models are of doubtful validity outside the 500 to 1500 MW(e) range. (ERA citation 08:026010)...Software Description: IBM360; FORTRAN IV and Assembly language; OS/360; 90K bytes.

INTEG;INSPEC; Markov Simulation of Reactor Operations.
L. M. Arnett.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-590 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048590 Price code: CP T03

These programs analyze the characteristics of a general model developed to represent the safety aspects of an operating nuclear reactor. These characteristics are the frequencies of incidents that are departures from the expected behavior of the reactor. Each incident is assumed to be preceded by a sequence of events starting at some initiating event. At each member in this sequence there may be functions such as safety circuits, and personnel operations that stop the sequence at that member. When mechanical devices fail they are assumed to remain inoperative until repaired. The model accounts for scheduled inspection and maintenance of all equipment in the system. INSPEC is limited to subsystems with no more than 7 safety circuits. The transition matrix can be made up as desired so that any intercorrelations between failures of circuits can be accommodated. In INTEG, failure rates of safety circuits are restricted to independence. (ERA citation 08:026247)...Software Description: IBM360; FORTRAN IV; OS/360.

PLETHS; Isopleth-Area Calculations from Single Source.
R. F. King.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-591 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048591 Price code: CP T03

PLETHS is a time-sharing isopleth-area program for determining ground-level areas of high pollutant concentration downwind of a single source of emission. These elliptical areas are enclosed by isopleths of constant concentration produced by continuous pollutant emissions from one smoke stack or ground source, or from a closely associated group of single

sources. Stack height, weather conditions, and source emission rate are typed in and the program calculates and describes the high pollution areas enclosed by isopleths. Calculations can be performed for any (nonreacting) gas or particulate matter. The resulting concentrations and isopleths are in parts per million (for gases of given molecular weight) or in micrograms per cubic meter (for any pollutant). (ERA citation 08:027347)...Software Description: GE400 Time-Sharing; GE-400 Time Sharing FORTRAN; GSA Time-Sharing System; Code lengths are: source, about 22,500 bytes, object, about 13,000 bytes, 3-bytes per 24-bit word.

SPEAKEASY MU+ Level; Language Processor Tso or Batch.
S. Cohen.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-593 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048593 Price code: CP T99

SPEAKEASY is a user-oriented language. It is intended to provide its users with the means of quickly formulating problems for computer processing and for obtaining answers to those problems in a minimum of time. (ERA citation 08:028657)...Software Description: IBM360,370,3033; FORTRAN IV (95%) and Assembler (5%); OS/360; A minimum of 130K of memory is needed for the MU090 processor, 190K for the MU150 processor, and 300K for the MU260 processor for the MU+ Level of SPEAKEASY.

ARC-XSEC1; Microscopic Cross Section Manipulation.
E. A. Kovalsky, J. Zapatka, H. Henryson, II, J. Hoover, and P. M. Walker.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-594 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048594 Price code: CP T13

ARC-XSEC1 provides the capability of manipulating multigroup microscopic cross section data in the XS.ISO format to affect modifications of the isotopic cross section components, to collapse the energy group structure to fewer groups, and to homogenize mixtures into material and composition level data for use by the neutronics modules of the Argonne Reactor Computation (ARC) System. (ERA citation 08:026148)...Software Description: IBM360; FORTRAN IV; OS/360; 300K bytes with a 10,000 doubleword container (default) and 2 peripheral I/O devices.

MAPPER-GEPI; Predicting Equipment Requirements.
R. J. Di Prima.
General Electric Co., St. Petersburg, FL. Neutron Devices Dept. 1984, mag tape ANL/NESC-595 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048595 Price code: CP T03

MAPPER is a computer program for predicting equipment requirements. It was designed as an aid to management and can interpret component production requirements backward from shipping schedules to the process of interest, calculate equipment capacity, display six months prior equipment utilization and process yield data. (ERA citation 08:028644)...Software Description: GE MARK III Time-Sharing; BASIC; GE MARK III Time-Sharing operation.

ENDFB2;GAND2;GFE2; ENDF/B to GAFGAR Cross Sections.
D. R. Mathews, and R. J. Archibald.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-596 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048596 Price code: CP T14

ENDFB2 converts ENDF/B cross section data from a card-image to a binary tape for use by the GAND2 and/or GFE2 codes. GAND2 prepares the cross sections needed for detailed computations of neutron energy spectra in reactors from a file of basic nuclear data in the ENDF/B Version II or III formats (also retains the ENDF/B Version I capability of GAND). GFE2 prepares 1/E or fission-spectrum weighted, zero temperature, infinite dilution group-averaged cross sections and scattering transfer arrays for use in the fast sections of the GGC and MICROX codes from a file of basic nuclear data in the ENDF/B Version II or III formats (the ENDF/B Version I format capability of the original GFE code is also retained). (ERA citation 08:026149)...Software Description: UNIVAC1108; FORTRAN V; EXEC8; 11,000 words for ENDFB2 program and data and a maximum of 4 magnetic tape units, 65K word available fast memory and 4 to 8 magnetic tape units plus 5 scratch files totaling about 1310K words in capacity for GAND2, 65K word available fast memory and 2 magnetic tape units plus 7 scratch files totaling about 1310K words in capacity for GFE2.

MATUS;MESH3D;APACHE; Three-Dimensional Finite-Element Elastic Analysis.
D. N. Hutula, B. E. Wiancko, and C. A. Crook.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-597R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048597 Price code: CP T16

The MATUS,MESH3D,APACHE set of programs performs small-strain elastic analysis of three-dimensional solids. The CDC version consists of the three programs. Only MESH3D, the mesh generator, is available in an IBM version. Problems with up to about 3200 nodes can be solved (with a central memory field length of 170,000 octal). Large bandwidths can cause overflow of data from extended core storage to lower speed disk storage which can greatly increase the running time of a problem. (ERA citation 08:028658)...Software Description: CDC6600,7600; IBM370; FORTRAN IV and COMPASS (CDC6600,7600), FORTRAN IV (IBM370); A description of the software environment and the hardware usage assumed by the program is contained in reference 4. In particular, the program is designed to run under the SCOPE 3.1.5 operating system on the CDC6600 and under SCOPE 1.1 operating system on the CDC7600. The IBM version of MESH3D runs under OS/360 or OS/370; The program was written for a CDC6600 or a CDC7600 with a central memory size of 64K and an extended core size of 512K. The actual amount of central memory and extended core used by the program depends on the problem size. The program requires a card reader, a line printer, a system disk, and 2 scratch disks. Also, a driver that allows writing-in-place is required for

the 2 scratch disks. MESH3D requires approximately 445K bytes for execution on an IBM370/195.

PELEN; Fuel Pellet Temperature and Deformation.
R. B. Stout, E. Duncombe, and J. K. Fischer.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-598R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048598 Price code: CP T12

PELEN solves a two-dimensional, axisymmetrical model of a fuel pellet and clad element for the temperature, stress, and deformation throughout a time history. In a general time increment, the computational sequence is - (1) a heat conduction analysis of both fuel and clad to determine the current temperature field which is dependent on the power rate, the material properties, and the geometrical configuration, (2) an incremental stress analysis of both fuel and clad to determine the current stress and deformation fields which are dependent on the inelastic strain increments (temperature, creep, volume expansion, etc.), the material properties, and the geometrical configuration, and (3) a contact analysis of both fuel and clad to determine the corrected current stress and deformation fields which are dependent on the extent of contact between adjacent fuel pellets and/or the fuel and clad. Maxima of 25 history intervals as input, where each interval can have an arbitrary number of subdivisions 200 finite elements. (ERA citation 08:026200)...Software Description: CDC6600; FORTRAN IV; 140,000 octal words of core storage, a printer, and extended core storage units.

TOPLYR2; Power Plant Thermal Discharge Study.
D. C. Kolesar, and J. C. Sonnichsen.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-599 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048599 Price code: CP T11

TOPLYR2 applies the first law of thermodynamics to compute the temperature of a water mass flowing in an open channel. The program is designed to accommodate variable depth, velocity, and cross section. The source of energy (location of the discharge) is assumed to be sufficiently distant from the river segment under examination that the momentum associated with the discharge is insignificant. Velocity distribution at both the inlet and outlet of the reach as well as the temperature distribution at the inlet as a function of time and at the outlet initially are specified. Eddy diffusivities, ambient meteorological conditions, and geometry are also supplied to the code. Although the lateral eddy diffusivity is allowed to vary spatially, the effect of density disparity is not treated explicitly by the code. Temporal behavior induced by variations in the ambient meteorological and boundary conditions are computed. Subscripted variables are dimensioned at compilation time using the UNIVAC1108 procedure definition processor. Code instructions require relatively little storage. A typical river simulation problem with adequate geometric-time mesh involves about 10,000 decimal words of storage (instructions, blank common and data). (ERA citation 08:027503)...Software Description: UNIVAC1108: FORTRAN V; EXEC2 or CSCX.

EGAD; Calculations of External gamma Dose Integrals.
R. E. Cooper.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-600 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048600 Price code: CP T03

EGAD calculates gamma dose integrals to a ground level receptor, for incremental values of the vertical dispersion parameter sigma-z, as a function of gamma energy and spatial distribution of the radioactive material. The dose integrals are representative of sector averages since the distribution of material is assumed to be Gaussian in the vertical, homogeneous in the horizontal, and bounded between ground level and an inversion lid. Calculated dose integrals are independent of radioactive decay, transport velocity, downwind distance, and sector width. Space attenuation and buildup are taken into account. (ERA citation 08:028362)...Software Description: IBM360/195; FORTRAN IV; OS/360; 40K bytes of core storage.

ERF;ERFC; Error and Complementary Error Function.
J. E. Vogel.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-601 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048601 Price code: CP T03

ERF and ERFC are used to compute values of the error function and complementary error function for any real number. They may be used to compute other related functions such as the normal probability integrals. (ERA citation 08:028659)...Software Description: CDC6600; FORTRAN IV; SCOPE; ERF and ERFC each require about 260 (octal) locations.

LENSDES; Nonlinear Least Squares Lens Design System.
B. Brixner, and T. C. Doyle.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-602 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048602 Price code: CP T11

LENSDES analyzes the performance of optical lenses by computing the image errors found when bundles of skew rays are traced from object points to the image surface. Lens performance is optimized by varying selected lens parameters under direction of the nonlinear least squares program, OPTIMIZ. All optical surfaces must be centered. With current dimensioning, the program allows maxima of 90 parameters (30 of which may be varied) 1440 error components 32 optical surfaces 3 colors of light 6 object points (including axial point). (ERA citation 08:028660)...Software Description:CDC7600,6600; FORTRAN IV; Operable under SCOPE 3.1 on the CDC6600 or under SCOPE 2.1 or the LASL-developed CROS system on the CDC7600; With current dimensioning, LENSDES requires 55,000 (octal) words of memory plus 50,000 (octal) words of extended core storage (ECS) on the CDC6600 or large core memory (LCM) on the CDC7600.

TCB01; Creep-Buckling of Tubes under Pressure.
W. K. Wilson.

Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-604-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048604 Price code: CP T09

A tube under external pressure, at elevated temperature, and initially out-of-round will creep, becoming more out-of-round and eventually will collapse. TCB01 attempts to predict the time of collapse. It is assumed that plane sections remain plane, the radial stress is zero, the temperature across the thickness is constant, the initial out-of-roundness follows a cosine law, and the tube is fixed axially. The program analyzes a simple tube of a single material. At the present time zircaloy is the only material available. (ERA citation 08:026150)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.1.5.

GAUSS5; Analysis of gamma-Ray Spectra Ge(Li).
R. G. Helmer, and M. H. Putnam.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-605 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048605 Price code: CP T14

GAUSS5 is used to determine gamma-ray energies and intensities from spectra obtained with a Ge(Li) detector and a multichannel pulse-height analysis system. GAUSS5 will handle spectra of up to 4096 channels with up to 300 peaks and 50 energy calibration lines. (ERA citation 08:027228)...Software Description: IBM360/75; FORTRAN IV; OS/360 MVT; One 9-track tape for spectral library and four disks, a printer and card punch.

GAPER1D; One-Dimensional Transport Perturbation Theory.
P. K. Koch.
General Atomic Co., San Diego, CA. 1984, mag tape ANL/NESC-606 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048606 Price code: CP T11

Reactivity coefficients are computed using first-order transport perturbation theory for one-dimensional multi-region reactor assemblies. The number of spatial mesh-points and energy groups is arbitrary. An elementary synthesis scheme is employed for treatment of two- and three-dimensional problems. The contributions to the change in inverse multiplication factor, delta(1/k), from perturbations in the individual capture, net fission, total scattering, (n,2n), inelastic scattering, and leakage cross sections are computed. A multi-dimensional prompt neutron lifetime calculation is also available. The formulation of the synthesis scheme used for two- and three-dimensional problems assumes that the fluxes and currents were computed by the DTF4 code (NESC Abstract 209). Therefore, fluxes and currents from two- or three-dimensional transport or diffusion theory codes cannot be used. (ERA citation 08:026151)...Software Description: UNIVAC1108; FORTRAN IV; EXEC8; One I/O device for reading input and printing results and one tape drive to read the code from tape. Core storage requirements are variable.

SPIRAL; Full-Text Storage, Search and Retrieval.
L. E. West.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-607-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048607 Price code: CP T17

The general ability of SPIRAL is building, perhaps gradually, a machine-readable encyclopedia of information items that are or may become important to a particular project, and then later, recalling bits of information as required. The information content of a collection can range from cryptic comments (as occur in some test and inspection records) to more lengthy entries (such as technical abstracts and management briefs) as well as full text of documents. Input documents must contain less than 4096 paragraphs, and paragraphs must contain less than 4096 words. For processing efficiency, a given accumulation of documents should not exceed approximately 1000 documents or approximately a million words. (ERA citation 08:028778)...Software Description: UNIVAC1108; FORTRAN V and Assembly language; EXEC8; UNIVAC1108 FASTRAND II drum, FH-432 drum, card reader, printer, and tape drive.

TRIPLET; Two-Dimensional Triangular Mesh Transport Program.
T. R. Hill.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-608 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048608 Price code: CP T14

TRIPLET solves the two-dimensional multigroup transport equation in planar geometries using a regular triangular mesh. Regular and adjoint, inhomogeneous and homogeneous (keff and eigenvalue searches) problems subject to vacuum, reflective or source boundary conditions are solved. General anisotropic scattering is allowed and anisotropic distributed sources are permitted. Variable dimensioning is used so that any combination of problem parameters leading to a container array less than MAXLEN can be accommodated. On CDC machines MAXLEN can be about 40,000 words and peripheral storage is used for most group-dependent data. (ERA citation 08:028661)...Software Description: CDC7600,6600;IBM360; FORTRAN IV; Six output (scratch) units and two system I/O units are required. Use of five interface units is optional. On the CDC machines a large bulk memory is required.

INDX; X-Ray Diffraction Powder Pattern Indexing.
R. B. Roof, Jr.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-609 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048609 Price code: CP T09

INDX provides a means for rapidly defining and testing trial unit cells as an aid to indexing powder patterns of crystal structures of unknown symmetry. The number of observed q values cannot exceed 100. The maximum value of q= 2.0. (ERA citation 08:028662)...Software Description: CDC6600; FORTRAN IV and COMPASS; SCOPE 3.

FUNPACK Release 2; Special Function Routines.

W. J. Cody, and B. S. Grabow.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-610 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048610 Price code: CP T14

FUNPACK Release 2 is a collection of FORTRAN subroutines to evaluate certain special functions. It replaces the 1973 FUNPACK package. The routines have been certified under the NATS project for the IBM 360/370, CDC6400/6600 and UNIVAC 1100 series computers...Software Description: IBM 360/370, CDC 6000-7000, UNIVAC 1108/1110; FORTRAN IV; IBM OS/360, OS/MVT, CDC NCAR, SCOPE (3.3/3.4), UT2D, UNIVAC EXEC8, EXEC31/244E, EXEC MACC31.66.

CHILES; Linear Elastic Singularity Modeling.
S. E. Benzley, and Z. E. Beisinger.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-611 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048611 Price code: CP T11

CHILES is a finite element computer program that calculates the strength of singularities in linear elastic bodies. Plane stress, plane strain, and axisymmetric conditions are treated. Crack tip singularity problems are solved by this version of the code, but any type of integrable singularity may be properly modeled by modifying selected subroutines in the program. CHILES allows three singular points to be modeled in the body being analyzed and each singular point may have coupled Mode I and II deformations. 1000 nodal points may be used. (ERA citation 08:028664)...Software Description: CDC6600; FORTRAN (FORTRAN Extended); SCOPE 3.3.

QMESH;RENUM; Self-Organizing Mesh Generation.
R. E. Jones, and H. E. Edwards.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-612 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048612 Price code: CP T13

QMESH generates meshes having quadrilateral elements on arbitrarily shaped two-dimensional (planar or axisymmetric) bodies. The main intended application is in finite element analysis. A flexible hierarchal input scheme is used to describe bodies to QMESH as collections of regions. A mesh for each region is developed independently, with the final assembly and bandwidth minimization performed by the separate program, RENUM. QMESH can process up to 25 regions, each having as many as 600 nodes. The maximum number of regions may easily be increased with little increase in program size, but increasing the maximum number of nodes per region is more costly. RENUM can process meshes having up to 2000 elements. (ERA citation 08:028665)...Software Description: CDC6600;IBM360,370/195; FORTRAN IV; SCOPE 3.3 (CDC6600), OS/360.370 (IBM360,370); 42,000 (decimal) words and an SD4020 plotter (CDC6600), 260K bytes and a CalComp 936 plotter.

NRTS ENVIRONMENTAL SUBROUTINES; FORTRAN Utllities.
R. J. Wagner.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-613 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048613 Price code: CP T16

The NRTS ENVIRONMENTAL SUBROUTINES are a collection of routines designed to aid the programmer by providing extensions to the FORTRAN language, data management services, and programming aids. In Edition B of the STH20 water property package a pressure restriction has been removed and pressure-enthalpy (STH205) and pressure-internal energy (STH206) subroutines are included. (ERA citation 08:028666)...Software Description: IBM360,370; FORTRAN IV and Assembly language; OS/360,370.

HISTOGRAMS; Quality Control Sample Statistics.
L. A. Elrod, and G. C. Hynes.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-614 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048614 Price code: CP T09

HISTOGRAMS provides graphical representation of lot sample characteristics in the form of histogram bars. On large lot samples, if a histogram bar should exceed fifty units, the entire histogram plot is automatically scaled by the smallest integer that will cause the largest frequency to fall within the maximum plot of fifty units. The number of cells in the histogram can vary from 3 to 22. The equal intervals are determined by the difference of the upper and lower boundaries divided by the number of cells less two. In addition to the plot, the program provides statistical characteristics in the form of: the mean, standard deviation, skewness, kurtosis, range, number of standard deviations between the mean and the two specification limits, and up to nineteen values falling outside the boundary limits. A maximum of 22 cells can be plotted. (ERA citation 08:028667)...Software Description: IBM360,370/195; FORTRAN IV; OS/360,370; 18K bytes for program, 27K bytes for load module.

REXCO-H (Release 2); Two-Dimensional Hydrodynamic Response to Excursion.
Y. W. Chang, J. Gvildys, and S. H. Fistedis.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-615-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048615 Price code: CP T11

REXCO-H calculates the two-dimensional hydrodynamic response of primary reactor containment to a high-energy excursion. Maxima of 3000 grid zones 1000 cycles if CalComp display is required 20 materials 20 sections 10 reactor vessels 50 points for stress-strain table for reactor material. (ERA citation 08:026248)...Software Description: IBM360/195; FORTRAN IV; OS/360; 700K bytes of core, two 9-track tape units, one 7-track tape unit, IBM 2280 film recorder, CalComp 780 plotter.

HAFMAT; System Steady-State Flow Distribution.
L. H. Wunderlich, and D. R. Dolk.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-616-R U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048616 Price code: CP T11

HAFMAT was developed for the calculation of the steady-state distribution of flow to all paths of any given flow system when the flow geometry and heat addition are specified for every flow path and the system boundary conditions are defined. The system is considered as a network of flow paths or pipes. Capacity to treat networks of up to 90 nodes and 200 branches. Other maximum values are: 20 external branches 20 external nodes 100 heated branches 40 types of heated branches. Basic assumptions employed are that complete and instantaneous mixing of fluid occurs at all nodes and all flows which join at a node see the same static pressure at that node. (ERA citation 08:027049)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE 3.2; 76,000 (octal) words of core.

KEFF;MGBS;TGAN; Nuclear Criticality Safety.
H. K. Clark.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-617 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048617 Price code: CP T12

Three codes for nuclear criticality safety evaluations make up this package. The principal codes are a code for computing the buckling of fissile material moderated by water (MGBS) and a two-group diffusion theory code that uses parameters generated by the buckling code (TGAN). KEFF is an auxiliary code. KEFF computes keff from dimensions and extrapolation distances, or alternative dimensions, volumes, and masses corresponding to values of keff. MGBS allows a maximum of 23 regions and 9 types of material. TGAN is limited to 6 diffusion regions and 6 transmission regions. (ERA citation 08:026983)...Software Description: IBM360; FORTRAN IV; OS/360; 100K bytes of core are required for KEFF, 150K bytes of core for MGBS, and 135K bytes of core for TGAN.

GAPCON-THERMAL2 Rev. 1; Fuel Rod Thermal Performance.
C. E. Beyer, C. B. Hann, D. D. Lannig, F. E. Paniske, and L. J. Parchan.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-618 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048618 Price code: CP T12

GAPCON-THERMAL2 Rev. 1 calculates the thermal behavior of a nuclear fuel rod during normal steady-state operation. The program was developed as a tool for estimating fuel-cladding gap conductances and fuel-stored energy. Models used include power history, fission gas generation and release, fuel relocation and densification, and fuel-cladding gap conductance. The gas release and relocation models can be used to make either best-estimate or conservative predictions. Maxima of 15 axial nodes 35 time-steps. No mechanical plastic strain is considered. The thermal model is axisymmetric. The first time-step must be zero time and the second cannot be at zero power. (ERA citation 08:026201)...Software Description: (CDC6600,7600,CYBER74; FORTRAN IV; SCOPE 3.4 (CDC6600), NOS/BE (CDC CYBER74), SCOPE 2.1 (CDC7600); About 54K words of main memory is needed for compilation and execution.

ISOTAB; Pu Power Output from Mixed Isotopes.
J. Lemming, C. Rudy, M. Baston, and F. Conkle.
Monsanto Research Corp., Miamisburg, OH. Mound. 1984, mag tape ANL/NESC-619-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048619 Price code: CP T03

Given measured calorimeter measurement dates and the isotopic composition for a plutonium sample, ISOTAB computes for a sample of mixed isotopes (Pu238, Pu239, Pu240, Pu241, Pu242, and Am241) a table between two specified dates. The table contains: a) the power output (in watts), b) the specific power (in milliwatts/gram), c) the total plutonium mass (in grams), and d) the estimated error (in grams) for each date in the table. If you do not desire all the table values printed between the table start date and the table end date, a table interval greater than one day may be specified. This program cannot be used for samples containing Pu236. (ERA citation 08:026202)...Software Description: IBM360/50; FORTRAN IV; OS/360 MVT, Release 21.6; 38K core, a card reader, and a printer.

GROUP2; Group Theory of Lattice Dynamics.
J. L. Warren, and T. G. Worlton.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-620 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048620 Price code: CP T11

This program calculates the symmetry properties of lattice vibrations either for atomic crystals or for external modes of molecular crystals and generates the irreducible multiplier representations (IMR's) including the effects of time reversal invariance (TRI) on the symmetry coordinates. (ERA citation 08:028400)...Software Description: IBM360,370/195;CDC6600,7600; FORTRAN IV; OS/360 (IBM360) and SCOPE 3.1 (CDC6600); The IBM360 version requires 240K bytes to compile and 230K bytes to execute. The CDC6600 version requires 55,000 (octal) words to compile, 125,000 (octal) words to execute.

BH99; Extreme Value Distribution Data Analysis.
T. Shimamoto.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-621-R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048621 Price code: CP T09

BH99 is used for the statistical analysis of data based on the extreme value distribution. When fitting the distribution using order statistics, samples of sizes up to n= 35 may be computed. (ERA citation 08:028668)...Software Description: CDC6600; FORTRAN IV; SCOPE.

GAUSS6; Batch Analysis of Gamma-Ray Spectra.
R. G. Helmer, J. E. Cline, and M. H. Putnam.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-622 U.S. Sales Only. Price includes documentation.

Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048622 Price code: CP T15

GAUSS6 is used for the production analysis of gamma-ray spectra obtained with a Ge(Li) detector and a multichannel pulse-height analyzer system. In addition to determining gamma-ray energies and intensities, it provides isotopic identification, decay corrections and correlation of data from different peaks and different spectra to obtain isotopic decay rates. GAUSS6 will handle spectra up to 4096 channels, 300 peaks and 20 energy calibration lines. The subset of the isotopic library is limited to 1000 gamma rays. (ERA citation 08:026808)...Software Description: IBM360/75; FORTRAN IV, BAL, PL/1; OS/360 MVT; GAUSS6 requires storage devices for the spectral library, nuclide library subset, and the correlation data in addition to three scratch devices and the card reader and printer. CORLAT requires storage devices for the secondary library subset and the correlation data plus four scratch devices and the card reader and printer.

SETS; Set Equation Transformation System.
R. B. Worrell.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-623 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048623 Price code: CP T11

SETS is used to achieve the symbolic manipulation of set (or Boolean) equations, particularly the reduction of set equations by the application of set identities. Any properly formed set equation involving the set operations of union, intersection, and complement is acceptable for processing by the SETS program. (ERA citation 08:028669)...Software Description: CDC6600; FORTRAN Extended; SCOPE 3.3; CDC6600 with extended core storage.

GRAPH; Linear Regression with Confidence Limits.
D. L. Wantoch, and W. J. Kirk.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-624 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048624 Price code: CP T12

This program calculates and graphs statistical results of experimental data. It calculates the linear regression, correlation coefficients, the confidence intervals for 90-95-99 percent confidence that the next sample will be within the printed interval, the 90 percent confidence interval that 95 percent of the remaining population will be within, and the mean and standard deviation of each parameter. The program graphs these confidence intervals, the regression line and the experimental data to obtain a visual indication of correlation. Input data is printed in tabular form and all dependent data are displayed against all independent data, one parameter at a time. (ERA citation 08:028670)...Software Description: IBM360,370/195; FORTRAN IV; OS/360,370; 19,880 bytes for program.

VARI-1D; One-Dimensional Variational Sensitivity.
W. M. Stacey, Jr., and J. P. Regis.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-625 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048625 Price code: CP T14

The VARI-1D code calculates estimates of changes in reactivity worths, keff, reaction rates, power fractions, prompt-neutron generation time, delayed neutron effectiveness, and flux integral ratios due to changes in nuclear data or composition by use of a variational formalism. The code is applicable to a wide range of reactor or critical experiment design problems and sensitivity studies. Maxima of 50 spatial mesh points 10 material regions 15 isotopes 10 fissionable isotopes 27 energy groups 15 downscatter groups. The geometry is one-dimenionsal slab, cylinder, or sphere. The boundary conditions are phi = 0 and/or phi' = 0. (ERA citation 08:028671)...Software Description: IBM360,370/195; FORTRAN IV is used except for subroutine SQUEZE which is in Assembly language; OS/360,370; A typical execution requires about 450K bytes. One peripheral I/O device is required for a cross section input file.

TOODY2; Two-Dimensional Lagrangian Equations of Motion Solution.
L. D. Bertholf, and S. E. Benzley.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-627 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048627 Price code: CP T11

TOODY2 is used to compute wave propagation in two dimensions in rectangular or cylindrical coordinates. Maximum per problem of 19 different materials. (ERA citation 08:028673)...Software Description: CDC3600; 3600 FORTRAN; SCOPE 6.2.

ETOT-3; ENDF/B V3 Data to Thermal Library Form.
C. L. Beard, R. A. Dannels, and M. Raymund.
Westinghouse Electric Corp., Pittsburgh, PA. Nuclear Energy Systems Div. 1984, mag tape ANL/NESC-628 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048628 Price code: CP T14

ETOT-3 processes basic nuclear information given in the ENDF/B format (reference 3) and produces data decks for use in generation of KATE, THERMOS, TEMPEST and LASER libraries. In addition to the restrictions on the ENDF/B data itself, ETOT-3 has the following restrictions: Maxima of 309 groups or points 500 resolved resonances ETOT-3 will process ENDF/B-III data. A predigested file called the Universal Supergroup System (see ETOT-3 document) is also acceptable. (ERA citation 08:028674)...Software Description: CDC7600; ANSI Standard FORTRAN (FORTRAN IV); SCOPE 2.0; Core storage required by the program, associated system library functions, and SCOPE 2.0 operating system is 50,000 locations. The program uses one scratch tape in addition to the library tape and standard input, output and punch units.

ORRIBLE; Rod Bundle Flow and Temperature Distribution.
J. L. Wantland.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-629 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch

tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048629 Price code: CP T12

ORRIBLE is a group of programs used to predict flow and temperature distribution for steady single-phase flow through bundles of heated rods separated by helical wire-wrap spacers. Any combination of flow subchannels can be blocked at the inlet. Turbulent interaction, sweeping cross flow due to the wire wrap, and transverse thermal conduction are considered. The eleven ORRIBLE programs in the package are for three duct configurations of 19-rod bundles, and for 37-, 91-, and 217-rod bundles in hexagonal ducts. In three versions, periodic channel area variations due to the wire wraps moving through channels and the possibility of the rod bundle forming a helix in the duct are considered. For each program, the component dimensions, flow parameters, thermal parameters, etc. may be varied within reasonable limits. A new program must be written in order to study the effect of a different duct cross-section shape or a different rod arrangement. (ERA citation 08:026203)...Software Description: IBM360,370/195; FORTRAN IV; OS/360,370; No sample problem required more than 120K bytes during execution. The three programs for 217-rod bundles required 400K bytes for compilation.

LATIN SQ; N X N Latin Square Experimental Design.
A. D. Grandillo, and T. C. Bishop.
Monsanto Research Corp., Miamisburg, OH. Mound. 1984, mag tape ANL/NESC-630 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048630 Price code: CP T11

LATIN SQ is used for the statistical analysis of data generated from an N x N Latin Square experimental design. The program output includes an analysis of variance table for testing the significance of the row, column and treatment main effects. The analysis of variance table also includes information for testing the linear and higher-order curvilinear components for each main effect. A subroutine is provided for performing Duncan's new multiple range test for making all pair-wise comparisons among the factor level mean values. The program is designed to handle Latin Squares of size 3 x 3, 4 x 4, .., 10 x 10. (ERA citation 08:028675)...Software Description: IBM360/50; FORTRAN IV; DOS/360; 25K memory.

RAFFLE2/MOD2; Monte Carlo Neutron Transport.
W. E. Vesely, F. J. Wheeler, R. S. Marsden, and D. E. Wessol.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-631 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048631 Price code: CP T16

RAFFLE is a three-dimensional general-purpose Monte Carlo program for the solution of static neutron transport problems. Either fission source iteration or external source problems can be solved. Reaction rates and fluxes or cell-averaged P0 and P1 transfer matrices can be obtained for up to 100 input energy groups. Multiplication factors, lifetimes, generation times, and probable errors are also computed. Groupwise currents from any region to adjacent regions can be computed. A zone geometry option, designated "mixed" zone geometry, is included to simplify the preparation of input data for problems having an array of fuel pins. This option combines features of the rectangular, cylindrical r-z, and cylindrical r-theta-z zone geometries in a two-level zone search. Maxima of 100 energy groups for editing 200 surfaces 400 regions. (ERA citation 08:026152)...Software Description: IBM360/75,370/195; FORTRAN IV and Assembly language; OS/360,370; 570K bytes of memory.

MMM3; Coordinate Analyses Semi-Rigid Molecules.
H. L. McMurry, and D. H. Speas.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-632 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048632 Price code: CP T09

MMM3 computes the eigenvalues (frequencies) and eigenvectors (normal modes) for a semi-rigid molecule, and computes the transformation matrix for expressing the Cartesian displacements of the atoms in terms of the normal coordinates. Computation of the effective atomic masses and mean-squared amplitudes of vibration for use in slow neutron scattering calculations is included as well. Matrices with dimensions up to 55 x 55 are acceptable. (ERA citation 08:026153)...Software Description: IBM360; FORTRAN IV; OS/360; 300K bytes of memory.

LANL-J501; SC-4020 Emulation Graphics Library.
G. L. Rein, T. Reed, B. Buzbee, G. Carter, and D. Kahamer.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-633 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048633 Price code: CP T13

LANL-J501 is a library of graphics subroutines developed to emulate graphics routines originally written for use with the Stromberg Carlson Model 4020 film recorder (SC-4020). The SC-4020 has been superseded and output may be directed to various newer output devices; however, these subroutines ensure compatibility for applications programs. (ERA citation 08:028676)...Software Description: CDC6600,7600;CRAY1;VAX11/780; FORTRAN. The compilers used are - FTN (CDC6600,7600), CHAT (CDC7600B), CFT (CRAY1), FOR (VAX11/780); NOS (CDC6600), LTSS (CDC7600,7600B), CTSS (CRAY1), VMS (VAX11/780); The CDC6600 and CDC7600 versions of LANL-J501 require 120,000 (octal) words of memory; the VAX11/780 version requires 130K bytes.

REBUS2; Fuel Cycle Analysis for Fast Reactors.
B. J. Toppel.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-634 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048634 Price code: CP T99

REBUS2 is a system of codes designed for the analysis of fast reactor fuel cycles. Two basic types of analysis problems are solved--the infinite-time, or equilibrium, conditions of a reactor operating under a fixed fuel management scheme, and the explicit cycle-by-cycle, or nonequilibrium, operation of a reactor under a specified periodic fuel management program. For the equilibrium type problems, the code uses specified external fuel supplies to load the reactor. Optionally, reproc-

essing may be included in the specification of the external fuel cycle and discharged fuel may be recycled back into the reactor. For non-equilibrium cases, the initial composition of the reactor core may be explicitly specified or the core may be loaded from external feeds as in equilibrium problems. Three types of search procedures may be carried out in order to satisfy user-supplied constraints - (a) adjustment of the reactor burn cycle time to achieve a specified discharge burnup, (b) adjustment of the fresh fuel enrichment to achieve a specified multiplication constant at a specified point during the burn cycle, and (c) adjustment of the control poison density to maintain a specified value of the multiplication constant through- out the reactor burn cycle. Recycle of discharged fuel is not allowed in non-equlibrium type problems. Only two-dimensional problems are handled. (ERA citation 08:026122)...Software Description: IBM360,370; FORTRAN IV (99%) and Assembly language (1%); OS/360,370; At least 400K bytes of memory are required (530K and 418K for the two sample problems, respectively). Creation of a load module requires a total of approximately 9.3 million bytes of direct-access storage.

SLACMON;SLACMON/370; OS360 MVT/MFT Performance Monitor.
V. Androsciani, R. A. Cook, B. Lonergan, and T. J. Butler.
Stanford Linear Accelerator Center, CA. 1984, mag tape ANL/NESC-635 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048635 Price code: CP T13

SLACMON and SLACMON/370 operating as systems' tasks or jobs under OS/VS2, are designed to monitor hardware and software performance over a given period of time. Input specified in the parameter field on the execute card coupled with the corresponding operand in the operator's start command allows selected functions to be performed. Five data sets optionally provide names of queues, I/O devices, or modules that the programs monitor. Output consists of a number of reports followed by a summary page; certain summary data may appear on the console device. The output is most useful for identifying bottlenecks and interactions, tuning a system for peak performance and for indicating desirable hardware and software reconfiguration. Meaningful reports are prepared for the disks, drums, tapes, printers, and readers. Average SEEK/RPS and data transfer times, not calculated in SLACMON, are available with SLACMON/370 for the 3330 and 2305 RPS devices. SLACMON/370 can report cylinder usage also. (ERA citation 08:028677)...Software Description: IBM360,370; Assembly language; OS/360 MVT or MFT (SLACMON), OS/370 VS2 Release 1.6.

6KILER; Core Heatup Code for BWR/6 Analysis.
R. W. Griebe, K. D. Pichert, M. E. Radd, and C. M. Moser.
Energy, Inc., Idaho Falls, ID. 1984, mag tape ANL/NESC-636 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048636 Price code: CP T09

6KILER was developed for predictive and post-test analyses of core heat transfer during a loss-of-coolant accident for a General Electric BWR/6 type nuclear reactor plant. The program applied only to the geometry and materials of the General Electric BWR/6 reactor core. (ERA citation 08:026249)...Software Description: IBM360,370/195; FORTRAN IV (95%) and BAL (5%); OS/360; 210K bytes required to execute the program.

GAMTAB; Radioactive-Decay gamma-Ray Catalog.
W. W. Bowman, and K. W. MacMurdo.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-637 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048637 Price code: CP T16

This package contains a two-part catalog of gamma rays emitted by nuclides in radioactive decay and a list of corresponding references. The first part lists the gamma rays in order of ascending energy. This listing consists of gamma-ray energy and uncertainty, abundance, half-life, production mode, and the energies of two of the more abundant associated gamma rays. The second part of the catalog lists up to 50 of the more abundant gamma rays for each nuclide. The listing for each nuclide includes half-life, production mode, possible genetic relationships, and references. This listing is followed by the energy, uncertainty in energy, and abundance of each gamma ray. References available through May 1973 corresponding to the reference keys listed for each nuclide in part 2 are listed as the third file.IBM360. (ERA citation 08:026954)

RIGEL4;CHECK4;SUMUP4;LISTF4; PLOTF4;RESEND;CRECT;DICT4;CAREN4 ENDF/B V4 Processing Codes.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-638 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048638 Price code: CP T15

These programs are updated versions of ENDF/B checking, retrieval, and display codes capable of processing the Version-IV data files. RIGEL4 retrieves ENDF/B data and changes mode (BCD-BIN) or arrangement. Updated version processes decay data (mf= 1, mt= 457) and error files. CHECK4 checks the structure, consistency, and formats of ENDF data files. Updated version recognizes newly defined mt and mf numbers, checks mt= 457 and the formats of the error files, contains RSIC photon file changes. SUMUP4 checks whether partial cross sections add up to the total. Updated version flags grid points present in the partial cross section, absent in the total. LISTF4 produces interpreted listings of ENDF/B data. Updated version lists mt= 457, skips over error files, contains minor corrections. PLOTF4 produces plots of ENDF/B data. Updated version plots mt= 457, skips over error files, contains minor corrections. RESEND processes ENDF materials with resonance parameters into a pointwise form. Capability of processing Adler-Adler parameters added. CRECT corrects ENDF/B data files. DICT4 generates a section table of contents (dictionary) for ENDF/B materials. CAREN4 tests for discontinuities across the limits of resonance ranges of an ENDF/B material. Updated version contains minor corrections. (ERA citation 08:026961)...Software Description: CDC6600; FORTRAN IV; SCOPE.

POLLA; Converts R-Matrix Resonance Parameters.
G. de Saussure, and R. B. Perez.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-639 U.S. Sales Only. Price includes documentation. Tapes

can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048639 Price code: CP T03

The program transforms a set of r-matrix nuclear resonance parameters into a set of equivalent s-matrix (or Kapur-Peierls) resonance parameters. By DIMENSION statements, the program is limited to maxima of 100 levels and 5 channels. (ERA citation 08:028678)...Software Description: IBM360,370/195; FORTRAN IV; OS/360; The program requires 240K bytes to compile, 62K bytes to execute.

DE/STEP,INTRP;DEROOT/STEP,INTRP; Solution of Ordinary Differential Equations.
L. F. Shampine, and M. K. Gordon.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-640 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048640 Price code: CP T11

DE/STEP,INTRP performs the solution of an initial-value problem for a system of first-order ordinary differential equations to a fixed endpoint. With the companion program, DEROOT/STEP,INTRP, the endpoint may be specified implicitly as the root of a nonlinear function of the independent variable, the solution, and its first derivative. Each of these programs is supplied in both a basic and in a more versatile extended version. The basic versions are limited to the integration of a maximum of 20 equations, but the limit can be changed easily. The extended versions use variable dimensioning and have no fixed limits. (ERA citation 08:028679)...Software Description: IBM360;CDC6000-7000; ANSI STANDARD FORTRAN; OS/360 (IBM360), SCOPE 3.3 (CDC6600), SCOPE 2.1.3 (CDC7600); For execution of the basic version: 44K bytes (IBM360), 12000 (octal) words.

SAP4; Structural Analysis of Linear Systems.
S. Zawadzki, S. Gledhill, and B. Davis.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-641 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048641 Price code: CP T14

SAP4 is a structural analysis program for determining the static and dynamic response of linear systems. The structural systems to be analyzed may be composed of combinations of a number of different structural elements. Presently, the program contains the following element types - (a) three-dimensional truss element, (b) three-dimensional beam element, (c) plane stress and plane strain element, (d) two-dimensional axisymmetric solid, (e) three-dimensional solid, (f) variable-number nodes thick shell and three-dimensional element, (g) thin-plate or thin-shell element, (h) boundary element, and (i) pipe element (tangent and bend). The capacity of the program depends mainly on the total number of nodal points in the system, the number of eigenvalues needed in the dynamic analysis, and the computer used. There is practically no restriction on the number of elements used, the number of load cases, or the order and bandwidth of the stiffness matrix. (ERA citation 08:026984)...Software Description: IBM360,370,303x;UNIVAC1100; FORTRAN IV (IBM370), FORTRAN ASCII (99%) and Assembler (1%) (UNIVAC1100); OS/360,370 (IBM370), EXEC8 (UNIVAC1100); The computer resources required depend on the type of problem, and tradeoffs are selectable to an extent. Storage needs may vary from 250K to 2000K bytes (IBM370). Peripheral device usage has been optimized for static analysis and step-by-step integration. With program segmentation, the UNIVAC1100 version requires 53,000 words of memory for execution.

PROGLOOK; User Program Performance Monitor.
R. H. Johnson, and T. Johnston.
Stanford Linear Accelerator Center, CA. 1984, mag tape ANL/NESC-642 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048642 Price code: CP T11

PROGLOOK makes it possible to monitor the execution of virtually any OS/MVT or OS/VS2 Release 1.6 load module. The main reason for using PROGLOOK is to find out which portions of a code use most of the CPU time so that those parts of the program can be rewritten to reduce CPU time. For large production programs, users have typically found it possible to reduce CPU time by 10 to 30 percent without changing the program's function. The measured task cannot attach more than 254 subtasks. If the data produced by PROGTIME exceeds 127 distinct entities or 2500 histogram cells PROGLOOK terminates, producing no histograms. (ERA citation 08:028680)...Software Description: IBM360; FORTRAN IV and Assembly language; OS/360.

NUBOW; Structural Analysis Bowed Reactor Cores.
G. A. McLennan.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-643 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048643 Price code: CP T09

NUBOW performs a two-dimensional elastic analysis of reactor core systems subjected to thermal and/or mechanical bowing. Reactor assemblies are considered to be elastic beam members which may have variable geometry. Equilibrium forces and positions are calculated along with the shapes of individual rows. Clearance and local flexibility are allowed at all contacts. An axisymmetric model is assumed. Friction forces are not included. Possible contact is allowed only at specified axial locations on the assemblies. The program currently is dimensioned for maxima of 16 rows of beams and 25 nodes per beam. (ERA citation 08:026179)...Software Description: IBM360,370/195; FORTRAN IV; OS/360,370; 240K words of memory are required to compile, 130K to execute.

GETCOR;FRECOR; FORTRAN Dynamic Storage Allocation.
R. C. Durfee.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-644 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048644 Price code: CP T09

GETCOR and FRECOR are Assembly language subroutines which may be called from FORTRAN subroutines during execution to allocate and release core storage. Those variables for which core storage is to be allocated must be passed as arguments of the FORTRAN subroutines. These programs

allow variable dimensioning in subroutines without a previous specification of the maximum allowable dimensions. Before the FORTRAN subroutine can return to its caller it must release all core storage allocated to any of its arguments. (ERA citation 08:028681)...Software Description: IBM360,370 195; FORTRAN IV and Assembly language; OS/360,370; GETCOR occupies 1440 (decimal) bytes of storage and FRECOR, 1328 bytes.

DYNAMIC ANALYSIS OF GASES; Dynamic Analysis of Gases by Mass Spectrometry.
R. W. Loser, C. A. Chambers, and E. D. Ruby.
Dow Chemical Co., Golden, CO. Rocky Flats Div. 1984, mag tape ANL/NESC-645 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048645 Price code: CP T03

The program processes mass spectral data to determine the rate at which gases evolve from a solid sample and the total quantity of gas evolved. Calibration data and mass-peak measurements are described as input data. Gas flow rate and gas quantity are described as output data. It is used for the dynamic analysis of gases by fast scanning mass spectrometry. Although written for data obtained from a Bendix model 12-107 time-of-flight (TOF) mass spectrometer, it may be applied to any type of mass spectrometer. The Bendix mass spectrometer is used to continually monitor gases evolved during vacuum bakeout of solid samples. The technique is used to determine surface contaminants, adsorbed and trapped gases and other volatile outgas products. A total of 12 gases are used in the present study. (ERA citation 08:026809)...Software Description: IBM360; FORTRAN IV(G); IBM360 TSO.

COPYCAT; IBM OS System Catalog Utility Routine.
D. E. Engert.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-646 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048646 Price code: CP T12

COPYCAT is an OS utility program designed to produce an efficient system-wide catalog which may reside on many volumes. Substantial improvement in performance may also be obtained on a system with only a single catalog. First, catalog entries from many different catalogs may be redistributed to equalize the load on each catalog. Second, each individual catalog is restructured in a way designed to minimize the I/O time required for searching and updating. Redistribution and restructuring parameters are under user control. Model DSCB's for generation data groups and alias entries are also processed. Catalogs on all direct access devices, including data cells, are supported. Backup copies may also be made. Maximum of 32 catalogs defined as input COPYCAT has been designed for a catalog system where a high-level index name, other than a CVOL pointer, may only appear in one catalog. (ERA citation 08:028682)...Software Description: IBM360,370; Assembly language; OS/MVT, OS/MFT, OS/VS1 and OS/VS2 Release 1; A larger region size is recommended since COPYCAT will use all of the core available to it for buffers.

SLOP;CROSS; IBM 360 FORTRAN H Program Checker.
A. J. Strecok.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-647 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048647 Price code: CP T09

The package contains two PL/I codes, SLOP (Structural Layout Of Programs) and CROSS, designed to check IBM FORTRAN H source programs. SLOP examines the SYSPRINT file produced by a FORTRAN H compilation for local errors and sends its observations to CROSS which detects potential global errors. SLOP summarizes variables, labels, common blocks, and other items in a subroutine, showing which symbols are being improperly used. Optionally, the SLOP program can list the output from the original FORTRAN subroutine compilation, can list and save a 'corrected' and resequenced FORTRAN file, and save and list the information intended for the CROSS routine. For each subroutine CROSS tabulates: the subroutine name and size, entry points, listed but unused symbols, uninitialized variables, unreferenced statement numbers, internal statement numbers of input-output statements, symbols which appear in input-output statements, called subroutines, and the active variables in common and/or equivalence blocks, together with block names and addresses. CROSS lists common and/or equivalenced variables in alphabetic order with addresses and corresponding block names, along with the names of routines in which these variables are actively used. Any suspicious-looking or inconsistent items are flagged. The same information will also be sequenced and listed according to block names and addresses within each block. CROSS also produces a table designed to show instantly which routines need attention because SLOP found errors in them, which are missing or defined more than once, which routines are calling each routine, and how many times each routine is being called by the other. Finally, if any cycles of subroutine calls are detected, a second table indicating these recursive calls will be produced. The test case supplied with this package is designed to be self-explanatory, removing the need for separate documentation. A program containing up to 300 routines can be processed. (ERA citation 08:028683)...Software Description: IBM360,370,303x; PL/I; OS/360; 600K bytes of storage are required.

LUGS; Stress for Integral Attachments to Pipe.
W. G. Dodge.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-648 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048648 Price code: CP T03

LUGS calculates stresses, stress indices, and flexibility factors for a rectangular attachment on a cylindrical shell. Caution is recommended in using the code for attachments on very thin shells that have large circumferential dimensions and small longitudinal dimension as series convergence and/or numeric problems seem to exist. (ERA citation 08:028684)...Software Description: IBM360; FORTRAN IV; OS/360; 468K bytes of core storage are used.

COMQC; Quality Control Data Analysis Routines.
W. Rutherford, and G. M. Grogger.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-649 U.S. Sales Only. Price includes documentation.

Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048649 Price code: CP T09

COMQC is a quality control data analysis statistical program that calculates mean, standard deviation, range, skewness and kurtosis. Tolerance limits, confidence limits on the percent defective, and a one-way analysis of variance are also provided. (ERA citation 08:028685)...Software Description: IBM360; FORTRAN IV; OS/360; 300K bytes of core storage.

ELBOW-ORNL; Pipe Stress and Flexibility Calculations.
W. G. Dodge.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-650 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048650 Price code: CP T09

ELBOW-ORNL calculates the stresses, stress indices, and flexibility factors for in-plane and out-of-plane bending of elbows and curved pipe subjected to internal pressure. Comparison with experiments indicates that the results accurately represent the maximum stresses which occur at the center of the bend. The program does not account for the effects of end restraint or out-of-roundness. Since end-effects are not included, the calculated stresses and flexibility of the elbow may be larger than the actual values. (ERA citation 08:028686)...Software Description: IBM360; FORTRAN IV and Assembly language; OS/360; 80K bytes of core storage.

SOLA;SOLA-SURF; Transient Fluid Flow Algorithm.
C. W. Hirt, B. D. Nichols, and N. C. Romero.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-651 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048651 Price code: CP T09

SOLA and SOLA-SURF are numerical solution algorithms for transient fluid flows. SOLA is for incompressible fluid flows without free surfaces. SOLA-SURF, an extension of the SOLA code, permits a free surface or curved rigid boundary (free-slip) to be located across the top or bottom of the fluid region. The surfaces used in SOLA-SURF must be definable by single-valued functions. Also, the slope of the surface must not exceed the cell aspect ratio. (ERA citation 08:027985) Software Description: CDC7600; FORTRAN IV; SCOPE.

STFODE;COLODE; Collocation Solution of Stiff Ordinary Differential Equations.
B. L. Hulme, S. L. Daniel, and A. J. Strecak.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-652 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048652 Price code: CP T09

COLODE is a subroutine intended primarily for solving first-order systems of stiff differential equations by collocation methods. STFODE is a driver routine written to simplify the use of COLODE. Storage requirements limit the number of equations to about 100 for the CDC6600 version. (ERA citation 08:028687)...Software Description: CDC6600;IBM360,370; FORTRAN IV; SCOPE 3.3 (CDC6600), OS/360 (IBM360); CDC6600 version load used 24,500 (octal) words, sample problem execution 15,000 (octal) words. IBM360/370 version sample problem execution used 140K bytes.

MOCUS; Minimal Sets from Fault Trees.
J. B. Fussell, E. B. Henry, and N. H. Marshall.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-653 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048653 Price code: CP T11

From a description of the Boolean failure logic of a system, called a fault tree, and control parameters specifying the minimal cut set length to be obtained MOCUS determines the system failure modes, or minimal cut sets, and the system success modes, or minimal path sets. Output from MOCUS can include minimal cut and path sets for up to 20 gates. (ERA citation 08:028688)...Software Description: IBM360,370; FORTRAN IV; OS/360; 222K bytes for execution and 7 I/O units.

XDTRAP; Hydrogen Permeation with Trapping.
W. L. Pillinger, and G. R. Caskey.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-655 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048655 Price code: CP T09

XDTRAP calculates gas diffusion with trapping. The effect of trapping on hydrogen permeation and evolution was explored for a range of parameter values from computer-generated tables of concentrations of diffusing and trapped hydrogen. Maximum of 2000 mesh points along one space variable. (ERA citation 08:028689)...Software Description: IBM360; FORTRAN IV; OS/360; 126K for the execution step with program size = 98,364 bytes.

BESSEL FUNCTION PACKAGE; Airy and LOG gamma Subroutines.
D. E. Amos, and S. L. Daniel.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-656 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048656 Price code: CP T12

Subroutines for evaluating Bessel functions: J0(x), J1(x), I0(x), I1(x) for x between + and - infinity; Y0(x), Y1(x), K0(x), K1(x) for x greater than zero; Jnu(x), Inu(x) for x greater than or equal to 0 and nu greater than or equal to 0; Yn(x), Kn(x) for x greater than 0 and n= 0,1,2...; Airy functions: Ai(x), Ai'(x), Bi(x), Bi'(x) for x between + and - infinity; and the log gamma function: LNGAMMA(x) for x greater than 0. (ERA citation 08:028690)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.3.

LINDA; Evaluation of Strain-Gage Data.
W. G. Dodge.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-657 U.S. Sales Only. Price includes documentation. Tapes

can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048657 Price code: CP T09

LINDA implements a diagnostic procedure which depends upon the hypothesis that strain measurements obtained from a linear elastic structural test should be proportional to the applied loads. Nonlinearities in the data from such a test are expected to arise from errors in measuring or recording either the strains or the loads. The diagnostic procedure provides a means to identify and distinguish between the two types of errors. The code is currently dimensioned to handle data from 400 strain rosettes and 9 load steps. (ERA citation 08:027070)...Software Description: IBM360; FORTRAN IV and Assembly language; OS/360; 180K bytes of core storage are required for execution.

FRAP-T4;FRAP-T; Transient Analysis of Oxide Fuel Rods.
J. A. Dearien, L. J. Siefken, and M. P. Bohn.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-658 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048658 Price code: CP T18

The FRAP-T series of programs predict the thermal, mechanical and internal gas pressure response of a water-cooled, zircaloy-clad, oxide fuel rod during a loss-of-coolant accident (LOCA), power-coolant mismatch (PCM), or flow blockage accident. They consider the coupled effects of these response parameters by iterating to convergence at each time-step in a transient. Transient heat conduction is analyzed. Material and water properties required by FRAP-T are supplied by a material property subcode, MATPRO, and the STH20 subroutine. FRAP-T4 is the fourth in the series with each release incorporating the most recent advancements made in fuel rod response analysis models. Maxima of 20 axial nodes 20 radial nodes at each axial node single-rod analysis thermal reactor fuel rods, zircaloy-clad with water coolant. (ERA citation 08:026204)...Software Description: CDC7600;IBM360; FORTRAN (99%) and Assembly language (1%). The Assembly language is used in a few of the INEL Environmental Routines; OS/360 MVT (IBM360), SCOPE 2.1.1 (CDC7600); 147,000 (octal) words of SCM and 63,000 (octal) words of LCM are required for FRAP-T4. Execution of FRAP-T on the IBM360 required 350K bytes of storage and 450K bytes were used for compilation.

COBRA3M; Fuel Pin Thermal-Hydraulic Analysis.
W. W. Marr.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-659 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048659 Price code: CP T13

COBRA3M calculates the steady state and transient flow, coolant temperature and pressure drop in the subchannels of nuclear fuel pin bundles. In addition, it calculates temperatures of fuel, cladding, and duct wall. Array dimensions limit the program to handle maxima of 30 axial increments 7 pins 24 subchannels 30 gaps 6 segments for each pin 10 radial nodes in each segment 18 duct wall sections 10 radial nodes in each duct wall section. (ERA citation 08:026205)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 500K bytes of core.

JOURNAL CONTROL SYSTEM; Library Journal Management.
A. S. Klein, and M. Passiakos.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-660 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048660 Price code: CP T14

The JOURNAL CONTROL SYSTEM is a series of programs designed to handle all journal ordering for the three Union Carbide installations in Oak Ridge - ORNL, Y-12, and ORGDP. This series of programs provides: (1) management information in the form of cost, subscriber, and title statistics, (2) seven-copy purchase requisitions, and (3) claim letters to vendors relating to missing issues. In addition, computer check-in, notification of binding, and recording of journal arrival is supplied for the ORNL library operation. (ERA citation 08:028779)...Software Description: IBM360/75,91; COBOL and Assembly language; OS/360; A decimal feature machine with 200K memory.

SOLVEX; Solvent Extraction Process Simulation.
W. C. Scotten.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-662 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048662 Price code: CP T09

SOLVEX simulates the dynamic and steady-state behavior of solvent extraction banks composed of either mixer-settlers or centrifugal contactors. Two options permit terminating dynamic phases by time or by achieving steady-state, and a third option permits artificial rapid close to steady-state. Distribution data may be expressed in the form of tables or cubic polynomial equations. Maxima of 24 stages for the bank 5 chemical components 5 tables and 5 equations of distribution data 2 methods of expressing distribution of each component. (ERA citation 08:026810)...Software Description: IBM360; FORTRAN IV; OS/360; Less than 125K bytes are required for the load module.

COMRADEX4; Accident Released Radiological Dose.
J. Otter.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-663 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048663 Price code: CP T09

COMRADEX4 was developed to evaluate potential radiological doses in the near (< 10**4 meters) environment of radioactive releases, especially postulated accident releases. Consequence-mitigating natural phenomena and engineered safety features, such as aerosol deposition inside and outside containment, meteorological dispersion, multiple containments, filtration, and shielding, may be calculated. Potential doses to body organs may be calculated from sources retained in containment, distributed in the atmosphere, and inhaled. Maxima of 150 entries per class in leakage and fallout rate tables 5 release times 20 detector locations 3 isotope classes 4 containment levels 500 isotopes 12 organ dose rate factors per isotope. (ERA citation 08:027422)...Software

Description: IBM370; FORTRAN IV (H extended); OS/370 VS2 Release 1.7; 300K bytes of memory are required. Two logical units are used as input and output (units 5 and 6), and two additional units may be needed. Use of several other units is optional.

FLOW3; Network Analysis of Three-Dimensional Two-Phase Flow.
S. G. Beus, and J. H. Anderson.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-664R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048664 Price code: CP T15

FLOW3 was developed for the steady-state thermal and hydraulic analysis of two-phase flow in three-dimensional geometries. The program was developed with particular application to the analysis of flow on the primary and secondary sides of a steam generator and may be applied to a variety of fluid flow problems of a general nature. The program employs a network representation of the flow field and predicts local fluid conditions based on a boundary value solution method. The FLOW3 program user specifies a flow region of interest as a network of nodes with interconnecting links. Flow may enter or leave the network at designated boundary nodes (where the pressure is fixed) or at designated source nodes (where the flow is fixed). The conservation equations for mass, energy, and momentum are solved for the steady-state enthalpy and pressure at each node and the flow in each link. Heat may be added to any links, and two-phase flow is allowed. Maxima of 350 nodes 700 links. (ERA citation 08:027050)...Software Description: CDC7600,6600; FORTRAN IV and COMPASS; SCOPE 1.1 (CDC7600) and SCOPE 3.3 (CDC6600); Large core memory (CDC7600) or extended core storage.

BETTIS ENVIRONMENTAL LIBRARY; Bettis Programming Environment Library.
W. R. Cadwell.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-665R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048665 Price code: CP T16

The BETTIS ENVIRONMENTAL LIBRARY consists of a large number of subroutines and functions which are available for use in application programs. These routines effectively extend the FORTRAN language in such areas as system communication, decimal input, file management, scratch I/O, storage allocation, and plotting. (ERA citation 08:028691)...Software Description: CDC6600,7600; Almost all of the environmental routines are written in FORTRAN IV, the remainder in COMPASS.

FTA; Fault Tree Analysis System.
W. J. Van Slyke, D. E. Griffing, and J. Diven.
Atlantic Richfield Hanford Co., Richland, WA. 1984, mag tape ANL/NESC-666 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048666 Price code: CP T11

The FTA (Fault Tree Analysis) system was designed to predict probabilities of the modes of failure for complex systems and to graphically present the structure of systems. There are three programs in the system. Program ALLCUTS performs the calculations. Program KILMER constructs a CalComp plot file of the system fault tree. Program BRANCH builds a cross-reference list of the system fault tree. Maxima of 175 basic events 425 rate events ALLCUTS may be expanded to solve larger problems depending on available core memory. (ERA citation 08:028692)...Software Description: CDC6600; FORTRAN IV (95%) and COMPASS (5%); SCOPE 3.4.2; 110K (octal) words for ALLCUTS, 65K (octal) words for KILMER, and 50K (octal) words for BRANCH.

BUCKLE; Creep Buckling of Initially Oval Tube.
P. J. Pankaskie.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-667 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048667 Price code: CP T03

BUCKLE is a one-dimensional computer code compiled to calculate the change in ovality, of an initially oval, closed-end finite length tube, as a function of time, temperature, neutron flux and uniform external pressure. The basic concept employed in BUCKLE is that a tube, which is slightly out-of-round, tends to become more out-of-round with time when subjected to net uniform external pressure. The timewise change in ovality occurs as a consequence of creep deformations arising from tangential compressive and tangential bending stresses produced by uniform external pressures acting on an initially oval tube. (ERA citation 08:026180)...Software Description: CDC6600; FORTRAN IV; SCOPE 4.2; 54K words addressable core storage are required.

TPT01; Two-Dimensional Few-Group Transport with Depletion.
R. J. Selva.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-669R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048669 Price code: CP T17

TPT01 solves the few-group neutron transport equation with P1 scattering in two dimensions using the discrete ordinate method. The geometries available are rectangular and cylindrical. The problem allows arbitrary up- and down-scattering between groups. Explicit solutions are available for both fixed-source and eigenvalue problems. The program performs gross block depletion for all isotopes in all depletable regions and also performs fine block depletion for any subset of the isotopes in selected regions. Maxima of 99 groups 250 discrete ordinates per quadrant. There are very few fixed constraints on spatial problem sizes. (ERA citation 08:028312)...Software Description: CDC7600,6600; FORTRAN IV and COMPASS; SCOPE 2.0; 64K small core memory, up to 500,000 words of large core memory (if available), and 4 non-system disks.

RCP01; Monte Carlo Neutron and Photon Transport.
N. R. Candelore, R. C. Gast, and L. A. Ondis, II.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-670R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048670 Price code: CP T16

RCP01 is a Monte Carlo program which estimates neutron capture rates and photon heating rates over the energy range important to the fission process, i.e., 10 Mev to 0 ev. There is a neutron eigenvalue capability as well as the usual fixed source capability. The geometry is modular comprising: (a) module zero, a set of concentric cylinders or spheres with axial material boundaries; (b) final modules, each a collection of rectangular or 60 degree parallelogram initial assemblies superimposed on module zero at arbitrary positions and angular orientations; (c) initial assemblies of rectangles and 60 degree parallelograms with internal structure determined by an overlay on a variable mesh; (d) optional use of doubly repetitive "subcells" containing arbitrary collections of non-intersecting elliptical surfaces within initial assemblies. Other geometric features include the geometry variation which provides trapezoidal and equilateral triangular final assemblies and composite final assemblies which are pairs of final assemblies, one arbitrarily positioned and oriented within the other. Edits of absorption, heating, and neutron production are produced, with corresponding uncertainties, for each material (composition) by nuclide by energy group. (ERA citation 08:028313)...Software Description: CDC7600,6600; FORTRAN IV with COMPASS equivalent routines for a selected few key subroutines; SCOPE 1.1, SCOPE 2.1.5 (CDC7600), SCOPE 3.3, 3.4 (CDC6600); CDC7600 or CDC6600 with variable requirement of Large Core Memory (LCM) or Extended Core Storage (ECS). The sample problem requires approximately 106K (octal) words of central memory and 46K (octal) words of ECS on the CDC6600.

RCPL1; Prepares RCP01 Cross Section Libraries.
A. V. Dralle, N. R. Candelore, and R. C. Gast.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-671R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048671 Price code: CP T14

RCPL1 calculates detailed Doppler-broadened neutron resonance cross sections from unresolved and either single-level or multilevel resolved resonance parameters, for any number of nuclides, within an arbitrary energy structure consisting of up to 99 epithermal groups and one thermal group. The highest energy groups are divided into as many as 500 energy intervals for resonance cross section detail. These groups also allow inelastic scattering, expressed through group-wise transfer matrices, for the resonance nuclides and for any number of additional nuclides without detailed resonance descriptions. Subsequent epithermal groups may be subdivided into 1000 intervals, and the thermal group may contain 299 intervals. Elastic scattering for each nuclide is described by the first four components of the differential scattering cross section in the CM system, and the thermal group will treat two P3 scattering kernels through thermal subgroup transfer matrices. RCPL1 also calculates Compton, photoelectric, and pair production cross sections for photon interactions with any number of nuclides, and the gamma emission spectra from these nuclides are tabulated. The arbitrary energy group structure consists of up to 100 groups, each divided into as many as 400 intervals. (ERA citation 08:028314)...Software Description: CDC7600,6600; FORTRAN IV (99%) and COMPASS (1%); SCOPE 1.1 (CDC7600), SCOPE 3.3, 3.4 (CDC6600); CDC7600 or CDC6600 with variable requirement of large core memory (LCM) or extended core storage.

HONDO; A Dynamic Response Finite-Element Code.
S. W. Key, S. Gledhill, and B. Davis.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-672 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048672 Price code: CP T11

HONDO is used to compute the time-dependent displacements, velocities, accelerations, and stresses within elastic or inelastic, two-dimensional or axisymmetric bodies of arbitrary shapes and materials. (ERA citation 08:028693)...Software Description: CDC6600;UNIVAC1100; FORTRAN IV (CDC6600), FORTRAN ASCII (96%) and Assembler language (4%) (UNIVAC1100); SCOPE 3.3 (CDC6600), EXEC8 (UNIVAC1100); Three tapes or other auxiliary storage devices are required in addition to the standard input/output units.

SIEX; LMFBR Fuel Pin Thermal Performance Model.
D. S. Dutt.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-673 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048673 Price code: CP T09

SIEX is a steady-state heat transfer code for the calculation of mixed-oxide fuel pin thermal performance and dimension change (swelling and thermal expansion) in a fast neutron environment. Fuel restructuring, fuel and cladding displacements due to swelling and thermal expansion, fuel-to-cladding gap heat transfer, and fission gas release are included to provide an assessment of fuel, cladding, and coolant temperatures. Maxima of 21 axial segments 10 radial nodes in the fuel 10 time-step per printout intervals. (ERA citation 08:026206)...Software Description: CDC6600,CYBER74; FORTRAN IV; SCOPE 3.4; The amount of core storage required is 50K (octal) of 60-bit words. No auxiliary storage is needed and the input/output devices are selected by the user.

SAFTAC; Monte Carlo Fault Tree Simulation Code.
P. A. Crosetti, and L. G. de Viedma.
United Nuclear Industries, Inc., Richland, WA. 1984, mag tape ANL/NESC-674 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048674 Price code: CP T09

SAFTAC is a Monte Carlo fault tree simulation program that provides a systematic approach for analyzing system design, performing trade-off studies, and optimizing system changes or additions. The program is dimensioned to handle 1100 basic input events and 1100 logical gates. It can be redimensioned to handle up to 2000 basic input events and 2000 logical gates within the existing core memory. (ERA citation 08:028694)...Software Description: UNIVAC1108;IBM360,370; FORTRAN V and SLEUTH (UNIVAC1108), FORTRAN IV (IBM360); CSCX or EXEC2 (UNIVAC1108), OS/360,370 (IBM360,370); 300K bytes for compilation, 140K bytes for running the sample problem on an IBM370.

EPISODE; Ordinary Differential Equation System Solver.
G. D. Byrne, and A. C. Hindmarsh.
Pittsburgh Univ., PA. Dept. of Mathematics. 1984, mag tape ANL/NESC-675 U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048675 Price code: CP T11

EPISODE is a package of eight subroutines for the numerical solution of the initial-value problem for systems of first-order ordinary differential equations. The package can be used for either stiff or non-stiff systems. It is especially suited to problems with intermittent high-speed transients. EPISODE is best suited to problems with intermittent high-speed transients. Smooth problems can lead to high overhead costs. Current dimensioning allows for 20 simultaneous equations. The documentation and comments in DRIVE show how to alter this limit. (ERA citation 08:028695)...Software Description: IBM360,370; FORTRAN IV; OS/360,370 (IBM360,370); 62K bytes are used to execute the double-precision version of the sample problem.

DEMO4; CRBR Reactor and Plant Transient Analysis.
W. H. Alliston.
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div. 1984, mag tape ANL/NESC-676R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048676 Price code: CP T13

DEMO4 is a simulation model used to generate thermal-hydraulic transients for the Clinch River LMFBR demonstration plant. The three heat transport loops of the plant are simulated by a two-loop model. One loop, the L-loop, represents two of the actual plant loops, and the second loop, the S-loop, represents a single plant loop. Thermal power is generated by point neutron kinetics and decay heat tables. The vessel internals are represented by a lower plenum, lower axial blanket, active core, upper axial blanket, radial blanket, bypass channel and an upper plenum with a variable sodium level and a cover gas. Plenum stratification on reduced flow can be modelled. The heated sodium leaves the vessel upper plenum to the primary heat transport system and returns to the vessel lower plenum. The overflow nozzle of the sodium purification system effects the vessel upper plenum level, as well as a user-input return flow from this system. Each primary heat transport system is represented by piping, valves, the primary pump tank with a free surface and cover gas, and the shell side of the IHX. Each intermediate heat transport system is represented by piping, the tube side of the IHX, the shell side of the superheater and evaporator, and the intermediate pump. Each water-steam system is represented by piping, recirculation pumps, the tube side of the superheater and evaporator, and a steam drum. The steam leaving all superheaters enters a common steam header, flows through piping to the turbine throttle valve and a steam dump valve. Limited modelling is provided for the feedwater system. The reactor core model in DEMO provides only for single-phase liquid sodium flow. The steam generator model represents the mixing zone as if it is a small mixed volume at the drum bottom. The remainder of the drum is assumed homogeneous. (ERA citation 08:026066)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.0; 1 user-defined tape or disk is required for optional plotting in addition to the standard input/output devices.

MARGE/SLUMP; Maximum Temperature LMFBR Fuel Pin.
D. H. Thompson, and A. Padilla, Jr.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-677 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048677 Price code: CP T09

The MARGE/SLUMP code performs a series of one-dimensional (radial) calculations at fixed intervals along the axial length of a LMFBR fuel element to determine sodium temperature, clad temperature, fuel temperature, central void diameter, and amount of fuel addition or removal necessary to maintain the inner surface of the central void at the melting temperature of mixed oxide fuel. Fuel relocation results must be processed manually. (ERA citation 08:026067)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 240K bytes of core.

MORTRAN2; Macro-Based Structured FORTRAN.
A. J Cook.
Stanford Linear Accelerator Center, CA. 1984, mag tape ANL/NESC-678 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048678 Price code: CP T12

MORTRAN2 is a FORTRAN language extension that permits a relatively easy transition from FORTRAN to a more convenient and structured language. Its features include free-field format; alphanumeric statement labels; flexible comment convention; nested block structure; for-by-to, do, while, until, loop, if-then-elseif-else, exit, and next statements; multiple assignment statements; conditional compilation; and automatic listing indentation. The language is implemented by a macro-based pre-processor and is further extensible by user-defined macros. The pre-processor output must be accepted by a FORTRAN compiler. (ERA citation 08:028696)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 170K bytes of memory.

RANDOM SAMPLING TABLE;RND424RQ; for Non-Bias Ordering.
F. L. Conkle, and T. C. Bishop.
Monsanto Research Corp., Miamisburg, OH. Mound. 1984, mag tape ANL/NESC-679 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048679 Price code: CP T03

This program is designed to generate a uniformly random sequence of numbers for ordering laboratory test samples to eliminate any bias from the testing. The starting number must be less than the ending number, and all numbers must be less than 2,147,483,648. (ERA citation 08:028697)...Software Description: IBM360; FORTRAN IV and COBOL; OS/360; A 64K region is required and 1 IBM2314 disk is used.

MARLOWE; Binary Collision Cascade Simulation.
M. T. Robinson.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-680 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048680 Price code: CP T15

MARLOWE generates atomic displacement cascades in crystalline solids and analyzes many of their properties. Analyses available include primary recoil range distributions, replacement sequence directions and length distributions, distributions of pair separations, and various detailed cascade reports. The program is limited to ten crystallographically or chemically nonequivalent atoms and 2000 displaced atoms in a single cascade in the IBM REAL No. 8 version of the program. The IBM REAL No. 4 and the CDC versions have four nonequivalent atoms and 5000 displaced atoms in a single cascade. (ERA citation 08:028401)...Software Description: IBM360,370; CDC7600; FORTRAN IV (97%) and BAL (3%) (IBM360,370), FORTRAN IV (CDC7600); OS/360,370 (IBM360,370), SCOPE 2.1 (CDC7600); The IBM version requires 550K bytes (REAL*4 form) and 440K bytes (REAL*8 form). The CDC7600 version requires 46,000 (octal) words of SCM and 365,000 (octal) words of LCM storage.

ACCEL/MOD2; Design of Printed-Circuit Boards.
C. J. Fisk, and D. L. Caskey.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-681 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048681 Price code: CP T18

ACCEL is a set of computer programs designed to aid in the construction of electronic printed circuit boards. The ACCEL system performs the following tasks - (1) edits the engineers' data, resolves the schematic into a node component-list, looks up physical and electrical data for the parts used in the circuit, and notes any errors in the data; (2) locates the components on the board by an iterative process; (3) lays out the interconnection pattern between components; and (4) generates the output plots. (ERA citation 08:027079)...Software Description: UNIVAC1108;CDC6600; FORTRAN and Assembly language; EXEC2 (UNIVAC1108) and SCOPE 3.1.5 (CDC6600); 45,000 decimal words of storage, 10 separate files (3 tape, the rest drum or disk), and a machine word length of 36 bits or greater.

GNATS;MESH2;GPRINT; Two-Dimensional Nonlinear Analysis.
M. L. Callabresi, and R. C. Young.
Sandia National Labs., Livermore, CA. 1984, mag tape ANL/NESC-682 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048682 Price code: CP T14

GNATS is a finite element computer program designed for nonlinear analysis of axisymmetric and two-dimensional static structures. All large arrays in GNATS, MESH2, and GPRINT are dynamically dimensioned to minimize storage requirements. (ERA citation 08:028698)...Software Description: CDC6600; FORTRAN IV (98%) and COMPASS (2%); SCOPE 3.4; Approximately 54,000 (octal) words of SCM plus a problem-dependent amount of ECS is used normally. Disk storage can replace ECS if one subroutine is changed.

NUFUEL; Nuclear Fuel Cycle Requirements.
A. J. Snyder.
Department of Energy, Washington, DC. Office of Nuclear Energy Programs. 1984, mag tape ANL/NESC-683 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048683 Price code: CP T11

Given a forecast of nuclear electric generating capacity, it is important to know the consequent time-related materials and services required to support it. These requirements depend on a number of parameters such as reactor types, plant operating capacity factor, expected availability of spent fuel reprocessing, policies concerning plutonium utilization (as breeder fuel and LWR recycle). These and other conditions are simulated by NUFUEL which calculates and prints annual requirements for separative work and uranium related to a schedule of nuclear plant additions. Related fuel cycle quantities such as plutonium production and requirements, requirements for conversion to UF(6), for fuel fabrication, and for spent fuel reprocessing are also calculated and reported on a real-time basis. Array dimensions limit the forecasting to periods of 30 years at a time. (ERA citation 08:026123)...Software Description: IBM370; FORTRAN IV; OS/370 MVT; The program requires 350K bytes to compile, 340K bytes to execute.

GEOCOST; Geothermal Energy Cost Analysis.
H. D. Huber, C. H. Bloomster, and R. A. Walter.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-684 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048684 Price code: CP T15

GEOCOST calculates the cost of generating electricity from geothermal energy. The version of GEOCOST in this release simulates the production of electricity using a steam power conversion cycle based upon either a dry steam or hydrothermal resource. Future extensions to the model will simulate the production of electricity using other power conversion technologies, particularly the binary fluid cycle. Current array dimensions provide for a maximum well field size of 625 wells and maximum operating period of 50 years from reservoir exploration through the economic life of the power plant. (ERA citation 08:025911)...Software Description: CDC6600,CYBER74; FORTRAN IV; SCOPE 3.4.2; At least 46K (decimal) memory is required.

EMERALD-NORMAL; PWR Activity Release and Dose.
S. G. Gillespie, and W. K. Brunot.
Pacific Gas and Electric Co., San Francisco, CA. Dept. of Mechanical and Nuclear Engineering. 1984, mag tape ANL/NESC-685 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048685 Price code: CP T12

EMERALD-NORMAL is designed for the calculation of radiation releases and exposures resulting from normal operation of a large pressurized water reactor. The approach used is similar to an analog simulation of a real system. Each component or volume in the plant which contains a radioactive material is represented by a subroutine which keeps track of the production, transfer, decay, and absorption of radioactivity in that volume. During the course of the analysis, activity is transferred from subroutine to subroutine in the program as it would be transferred from place to place in the plant. Some of this activity is then released to the atmosphere and to the discharge canal. The rates of transfer, leakage, production,

cleanup, decay, and release are read as input to the program. Subroutines are also included which calculate the off-site radiation exposures at various distances for individual isotopes and sums of isotopes. The program contains a library of physical data for the forty isotopes of most interest in licensing calculations, and other isotopes can be added or substituted. Because of the flexible nature of the simulation approach, the EMERALD-NORMAL program can be used for most calculations involving the production and release of radioactive material. These include design, operation, and licensing studies. Many parameters and systems included in the program, particularly the radiation waste-treatment system, are unique to the PGandE Diablo Canyon PWR plant. Maxima of 50 isotopes 9 distances 16 angular sectors 1 operating period 1 reactor power level. (ERA citation 08:026224)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 576K bytes of memory.

VENTURE; 1, 2, or 3-Dimensional Multigroup Diffusion.
D. R. Vondy, T. B. Fowler, and G. W. Cunningham.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-686 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048686 Price code: CP T19

VENTURE solves the usual neutronics eigenvalue, adjoint, fixed source, and criticality search (direct and indirect) problems, treating up to three geometric dimensions, maps power density and does first-order perturbation analysis at the macroscopic cross section level. (ERA citation 08:028315)...Software Description: IBM360/91,75,195; FORTRAN IV and Assembly language; OS/360; A 32K word memory is needed, and one much larger is preferable; auxiliary storage of the disk or drum type is essential, preferably several on different data channels. The programming for three-level hierarchy data storage is included to permit efficient use of an extended slow memory for large three-dimensional problems when such a memory is available. Typically, the code uses 27 logical I/O units.

SITE2; Energy Facility Siting Assessment.
N. A. Frigerio, L. J. Habegger, R. F. King, L. J. Hoover, and N. A. Clark.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-687 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048687 Price code: CP T11

SITE2 is designed to (1) screen candidate energy facility sites or areas within an electric utility region, based on the region's physical and socioeconomic attributes, the planned facility's characteristics, and impact assessments, and (2) evaluate the cumulative regional impacts associated with alternate energy supply options and interregional energy import/export practices, specifically, comparison of different energy technologies and their regional distribution in clustered or dispersed patterns. (ERA citation 08:025986)...Software Description: IBM360; FORTRAN IV; OS/360; 480K bytes of core storage are needed for compilation and execution.

OMCOST; Power Plant Non-Fuel Operation and Maintenance Cost Study.
L. C. Fuller, and M. L. Myers.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-688 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048688 Price code: CP T09

OMCOST estimates annual operating and maintenance expenses of steam-electric power plants exclusive of fuel. Base load nuclear and coal-fired plant types are included. Plants containing one through four units with unit net electrical output from 400 through 1300 MW(e) may be evaluated. OMCOST includes the option of a limestone wet scrubbing system for flue gas desulfurization for coal-fired plants. Both the LWR nuclear and coal-fired plant models use evaporative cooling towers. (ERA citation 08:025969)...Software Description: IBM360,370; FORTRAN IV (90%) and Assembly language (10%); OS/360; 86K bytes.

FLANGE-ORNL; Analysis of Flanged Joints.
E. C. Rodabaugh, and S. E. Moore.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-689 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048689 Price code: CP T09

FLANGE-ORNL calculates appropriate loads, stresses, and displacements for the flanges, bolts, and gaskets that comprise a flanged piping joint for internal pressure or moment loading on the pipe, temperature difference between the flange hub and ring, and variations in bolt load that result from pressure, hub-ring temperature gradient and/or bolt-ring temperature differences. Flanges considered may be tapered-hub, straight or blind. (ERA citation 08:028699)...Software Description: IBM360/91; FORTRAN IV; OS/360; 80K bytes memory for extraction and 270K bytes for compilation with standard system I/O units.

SEPHIS/MOD4; Solvent Extraction Simulation.
A. D. Mitchell.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-690R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048690 Price code: CP T11

SEPHIS/MOD4 simulates the solvent extraction portions of either the Purex or the Thorex process. The program iteratively applies an unsteady state mass balance to a series of ideal mixer settler stages to follow the changes in solute concentrations. Reasonably good agreement has been found between the calculated and experimental concentrations. The components considered by SEPHIS/MOD4 are nitric acid, thorium, uranium, plutonium (IV), plutonium (III), a plutonium reductant, and inextractable nitrate salts. A maximum of 100 stages is allowed. SEPHIS/MOD4 does not deal with fission product or solvent degradation product behavior. Perfect mixing is assumed to occur in the mixers and in each zone of the settlers. Entrainment is not considered. (ERA citation 08:025639)...Software Description: IBM360,370; FORTRAN IV; OS/360; 155K bytes of storage are required for execution of the sample problems.

LASIP3; CCCC Standard Interface File Processor.
G. E. Bosler, R. D. O'Dell, and W. M. Resnik.

Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-691 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048691 Price code: CP T13

LASIP3 processes Version III standard interface data files specified by the Reactor Physics Committee on Computer Code Coordination (CCCC). This processor performs two distinct tasks: namely, transforming free-field format, BCD data, into well-defined binary files and providing for printing and punching data in the binary files. (ERA citation 08:028700)...Software Description: IBM360; FORTRAN IV; OS/360; 25 logical units besides the standard input/output units.

SOLSYS; Solar Energy System Simulation Program.
M. W. Edenburn, and N. R. Grandjean.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-692 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048692 Price code: CP T99

SOLSYS simulates the transient response of solar energy systems. It can be used to predict performance characteristics of a system; parametric studies can be performed for optimization and to determine auxiliary fuel requirements. The program consists of a component subroutine library, an information subroutine library, a control-component subroutine library, and an executive program. A maximum of 80 components can be used in a system. Two dummy subroutines, EXSUB1 and EXSUB2, may be replaced by subroutines which describe components which are not already modeled in the subroutine library. (ERA citation 08:025872)...Software Description: CDC6600,7600; FORTRAN Extended; SCOPE 3.3, 3.4 (CDC6600). SCOPE 2.1 (CDC7600); SOLSYS requires 135K (octal) words for program storage. An additional 45K (octal) of ECS is needed for data storage. Two tape drives are used, one for a solar data tape and one for a weather data tape, and a disk or tape file is generated if the plotting option is exercised.

SOLDATABQ62; Albuquerque 1962 Solar Data.
E. C. Boes.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-693 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048693 Price code: CP T15

SOLDATABQ62 is a data collection consisting of readings of direct and total solar radiation intensities and related parameters for solar energy systems studies. The solar data measurements are for Albuquerque, New Mexico for the year 1962. The items presented are: hour, wind direction, wind speed, dry bulb temperature, wet bulb temperature, dew point, atmospheric pressure, sky cover, visibility, atmospheric precipitable water vapor content, hourly integral of direct-normal radiation, hourly integral of total-horizontal radiation, six readings of direct-normal intensity at 10-minute intervals, and six readings of total-horizontal radiation at 10-minute intervals. These data were compiled from strip-chart recordings of the National Climatic Center, Asheville, North Carolina. (ERA citation 08:025836)...Software Description: CDC6600; SCOPE.

FRAPCON2;FRAP-S3;FRAP-S1; Steady State Analysis Oxide Fuel Rods.
W. N. Rausch, R. E. Williford, D. D. Lanning, G. A. Berna, and M. P. Bohn.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-694 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048694 Price code: CP T16

FRAPCON2 is the most recent in the FRAPCON series of fuel rod response modeling programs. The FRAPCON series, like the earlier FRAP-S and GAPCON-THERMAL codes, is designed to predict the steady-state long-term burnup response of oxide fuel rods in light water reactors (LWRs). In addition, these codes generate the initial conditions for transient fuel rod analysis by the FRAP-T or RELAP programs. FRAPCON2 calculates the temperature, pressure, deformation, and failure histories of a fuel rod as functions of time-dependent fuel rod power and coolant boundary conditions. The phenomena modeled by the code include heat conduction through the fuel and cladding, cladding elastic and plastic deformation, fuel-cladding mechanical interaction, fission gas release, fuel rod internal gas pressure, heat transfer between fuel and cladding, cladding oxidation, and heat transfer from cladding to coolant. Material properties, water properties, and heat transfer correlation data are included. The FRAPCON series differs mainly from the earlier FRAP-S3 code in three respects. A different and more versatile temperature subcode, a dynamic dimensioning scheme, and more detailed modeling of the thermal and mechanical effects of fuel relocation are included in FRAPCON2. Other improvements include the addition of three advanced mechanics options, four fission gas release options, and an uncertainty analysis option. FRAPCON2 and the FRAP-S series are limited to single-rod analysis with 11 radial nodes. FRAPCON2 allows a maximum of 19 axial nodes and a maximum of 100 power time steps. FRAP-S codes allow a maximum of 15 axial nodes and 69 power time steps. (ERA citation 08:026154)...Software Description: CDC CYBER175,176;CDC7600;IBM360,370; FORTRAN IV (CDC CYBER175,176 and CDC7600), FORTRAN IV (85%) and BAL (15%) (IBM360); NOS (CDC CYBER175,176), NOS/BE, SCOPE (CDC7600), and OS/360 (IBM360); 300,000 (octal) words of storage are required for FRAPCON2 (CDC CYBER175,176); 143,000 (octal) words of storage are required for FRAP-S3 (CDC7600); and 260K bytes of memory are required for execution of FRAP-S1.

NMMSS; Nuclear Materials Management System.
E. H. Foreman, and W. G. Gregg.
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div. 1984, mag tape ANL/NESC-695 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048695 Price code: CP T13

Three basic programs in the Nuclear Materials Management and Safeguards System (NMMSS) for processing incoming transaction data and maintaining the current transaction data file are: TJEDIT, TJUPDT, and COMPAT. TJEDIT prepares, verifies, and maintains the integrity of data as it is introduced into the data base. TJUPDT maintains the current transaction data file on a daily basis. COMPAT maintains consistency between related data sets on the transaction data master file. (ERA citation 08:025778)...Software Description: IBM370;

ANS COBOL Version 3; OS/370; The three programs require utility input and output units for the IBM SORT procedure and a printer. TJEDIT requires 260K bytes for execution and two input/output devices (tape and direct-access). TJUPDT requires 158K bytes of storage for execution and four input/output devices. COMPAT requires 238K bytes of storage for execution, three input/output devices (two of which must be direct-access), and one card punch unit.

ENERGY; LMFBR Coolant Temperature Prediction.
B. C. J. Chen, E. U. Khan, W. M. Rohsenow, A. A. Sonin, and N. E. Todreas.
Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical and Nuclear Engineering. 1984, mag tape ANL/NESC-696 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048696 Price code: CP T11

This package consists of four independent programs, ENERGY1, ENERGY2, ENERGY3, and SUPERENERGY developed for predicting coolant temperature distributions in wire wrapped fuel and blanket assemblies of a liquid-metal-cooled, fast breeder reactor. (ERA citation 08:026068)...Software Description: IBM370: FORTRAN IV; OS/370; Compilation and execution required approximately 250K bytes storage for ENERGY1, 2, and 3; approximately 360K for SUPERENERGY.

F0355; Shaper Cutter Contour Generator.
L. K. Gillespie, D. Wantoch, and H. S. Edwards.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-697 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048697 Price code: CP T03

Program F0355 produces a plot which shows the geometry of the cutter required to produce a given external circular spur gear or ratchet wheel. It is particularly applicable for non-involute tooth forms. In addition, the program can provide a comparator chart for inspecting cutters, indicate whether a given geometry can be shaped, and be used to determine the effects of changes in pitch diameter and related variables. The output of the program is a magnified drawing of the shaper cutter, the workpiece, and the paths of the cutter teeth. The program does not print a numerical description of the cutter profile. Only one plot is drawn per computer run. Current dimensioning allows for a maximum of 2000 points to describe the complete profile of the workpiece. (ERA citation 08:028701)...Software Description: CDC6600,7600;IBM360,370; FORTRAN IV; SCOPE 3.4 (CDC6600), SCOPE 2.1 (CDC7600), OS/360,370 (IBM360,370); Approximately 55,000 (octal) words (CDC6600) or 126K bytes (IBM370) storage are required and auxiliary plotting equipment is used.

DUMP; User-Oriented Memory Dump Utility.
T. H. Strong.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-698 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048698 Price code: CP T11

DUMP is a user-oriented program dumping routine which provides diagnostics in English. It can be used to print a job's exchange package (operating registers) and part or all of its memory. It will print messages telling where the program was executing when it quit, why DUMP thinks it quit, and what routines have been called. (ERA citation 08:028702)...Software Description: CDC7600,6200,6400,6600; FTN V.3 and COMPASS V3; BKY software; 12,000 (octal) words of storage, a disk and printer are used.

ORSIM; Optimizing Utility Generation Planning.
B. E. Prince, and J. C. Turnage.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-699 U.S. Sales Only. Price inciudes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048699 Price code: CP T12

ORSIM is an electric power generating system integration model which simulates the multi-year operation of a mixed power system consisting of fossil, nuclear, hydroelectric, and pumped-storage units. For any specified refueling schedule for nuclear units and future load forecast, the model determines a plan of operation for the system which attempts to minimize the total discounted operating cost over a specified study period. The analysis considers the effects of forced outages, spinning reserve operating constraints, and scheduled introduction and retirement of generating stations. The model determines a maintenance schedule for the non-nuclear stations (nuclear stations are maintained during refueling outages) and the optimum allocation of energy-fixed nuclear and hydroelectric resources. It calculates the expected energy generated by each station in the system, by period over the planning horizon, based on input or calculated incremental operating cost. It also calculates the expected loss-of-load probability and unserved energy demand for each period in the planning horizon. An optimum operating plan, designed to minimize the discounted total production cost, is then calculated, as are the costs of operating each station in the system and the discounted total production cost for the derived plan of operation. Maxima of 90 nuclear stations 90 must-run stations (i.e., must operate at a specified capacity level) 90 two-piece stations (i.e., stations divided into two capacity blocks) 90 stations per system 90 maintenance seasons. (ERA citation 08:026512)...Software Description: IBM360,370,303x; FORTRAN IV (95%) and Assembly language (5%); OS/360,370; 750K bytes of memory are required for execution, and card as well as printer output is generated.

MELT3; Fast Reactor Transient Overpower Study.
A. E. Waltar, and R. J. Shields.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-700 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048700 Price code: CP T14

MELT3 is a multichannel, neutronics, thermal-hydraulics digital computer program developed to investigate the transient behavior of a fast reactor during postulated transient overpower conditions. Reactivity feedback resulting from Doppler broadening, coolant density change and expulsion, bulk core expansion, and fuel movement are explicitly taken into account. The bulk of the modeling detail has been addressed to the in-vessel portion of the reactor plant, although the friction and inertial aspects of up to three separate closed primary

loops can be simulated. A wide variety of accident conditions may be investigated. Particular modeling emphasis has, however, been placed on the simulation capabilities required for an unprotected transient overpower accident sequence. Calculations for up to 20 channels (e.g., 20 pins representative of subassembly clusters) and 20 axial segments within the fuel region may be performed simultaneously. A total of 10 different axial coolant flow zones having different flow areas (comprising a total of 75 nodes) can be explicitly modeled in the axial direction. (ERA citation 08:026069)...Software Description: CDC6600,7600,CYBER74; FORTRAN IV; SCOPE 3.4 (CDC6600,CYBER74), SCOPE 2.1 (CDC7600); With dummy plot routines, the steady state program requires 111,000 (octal) words of storage and 4 logical units. The transient program requires 161,000 (octal) words of storage and approximately 300K (decimal) words of peripheral storage on 9 logical units for wrapup and plotting.

BEAMCRP; Finite-Element Beam Creep Analysis.
W. H. Sutherland.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-701R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048701 Price code: CP T11

BEAMCRP is a finite-element computer program which solves for stresses and total strains (elastic plus creep) in beams. The beams may have variable cross sections along the length (x-direction). However, the cross sections must be symmetrical about the y-axis. Besides prescribed displacements and tractions, the boundary conditions may also include limited free travel and elastic spring supports. Time-dependent variations in applied loads, thermal gradients and material swelling can also be analyzed. Arbitrary creep and material swelling laws can be used. For beam bending in the x-y plane only, a maximum of 100 elements and 101 nodes can be used. A beam can have 10 layers of different materials and 15 changes in cross section. For combined beam bending in the x-y and x-z planes, the maxima of elements and modes are 50 and 51, respectively. (ERA citation 08:028703)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE; 145,000 (octal) words of storage, a tape unit for plot output, and 7 input/output files besides the system input/output units.

COMPARE; Transient Flow in Vented Fluid System.
R. G. Gido, R. G. Lawton, C. J. Grimes, and J. A. Kudrick.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-702 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048702 Price code: CP T09

COMPARE performs transient calculation of the thermodynamic conditions in volumes connected by flowing junctions with provision for mass and energy addition. Volume thermodynamics and junction flows are for homogeneous mixtures of: steam, two-phase water, any three perfect gases, or combinations of the above. Critical vent flow is based on the Moody equation. Subcritical flow is based on compressible orifice flow of an ideal gas-like mixture with inlet and exit losses resulting in a polytropic flow process. Flow with inertia is calculated on the basis of an incompressible subelement relationship. The program was written to perform transient subcompartment analysis of nuclear power plants. The program currently provides for maxima of: 100 volumes 200 junctions 5 mass and energy addition tables (blowdown sets). Water temperature is restricted to the range 278 to 620K (40 to 656F). (ERA citation 08:026250)...Software Description: CDC6600,7600;IBM360,370; FORTRAN IV; SCOPE 3.4 (CDC6600), SCOPE 2.1 (CDC7600), OS/360,370 (IBM360,370); 35,000 (octal) words (CDC6600,7600) or 125K bytes.

ORCENT2; Nuclear Steam Turbine Cycle Analysis.
L. C. Fuller.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-703 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048703 Price code: CP T12

ORCENT2 performs heat and mass balance calculations at valves-wide-open design conditions, maximum guaranteed rating conditions, and an approximation of part-load conditions for steam turbine cycles supplied with throttle steam, characteristic of contemporary light-water reactors. The program handles both condensing and back-pressure turbine exhaust arrangements. Turbine performance calculations are based on the General Electric Company method for 1800-rpm large steam turbine-generators operating with light-water-cooled nuclear reactors. Output includes all information normally shown on a turbine-cycle heat balance diagram. Maxima of 12 feed-water heaters and 5 moisture removal stages in the low-pressure turbine section. Limited to 1800-rpm tandem-compound turbine-generators with single- or double-flow high pressure sections and one, two, or three double-flow low-pressure turbine sections. (ERA citation 08:026035)...Software Description: IBM360,370,303x; FORTRAN IV; OS/360,370; 210K bytes of storage were needed for execution of the sample problems on an IBM3033.

COMCAN;COMCAN2A; System Safety Common Cause Analysis.
G. R. Burdick, J. R. Wilson, N. H. Marshall, and D. M. Rasmuson.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-704 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048704 Price code: CP T13

COMCAN2A and COMCAN are designed to analyze complex systems such as nuclear plants for common causes of failure. A common cause event, or common mode failure, is a secondary cause that could contribute to the failure of more than one component and violates the assumption of independence. Analysis of such events is an integral part of system reliability and safety analysis. A significant common cause event is a secondary cause common to all basic events in one or more minimal cut sets. Minimal cut sets containing events from components sharing a common location or a common link are called common cause candidates. Components share a common location if no barrier insulates any one of them from the secondary cause. A common link is a dependency among components which cannot be removed by a physical barrier (e.g., a common energy source or common maintenance instructions). COMCAN is limited to the analysis of fault tree minimal cut sets produced by other programs while COMCAN2A is an independent program, utilizing the fault tree code FATRAM, which is incorporated as a program module,

for a thorough analysis of the fault tree for sources of common cause failures. (ERA citation 08:026251)...Software Description: IBM360;CDC CYBER176,175; FORTRAN IV (30%) and BAL (70%) (IBM360), FORTRAN IV (97%) and COMPASS (3%) (CDC CYBER176); OS/360 (IBM360) and NOS/BE 1.4 (CDC CYBER176), NOS 1.3 (CDC CYBER175); 140K bytes of memory for COMCAN and 242K (octal) words of memory for COMCAN2A.

EPISODEB; Solve Ordinary Differential Equations Systems with Banded Jacobian.
G. D. Byrne, and A. C. Hindmarsh.
Pittsburgh Univ., PA. Dept. of Mathematics and Statistics.
1984, mag tape ANL/NESC-705 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048705 Price code: CP T11

EPISODEB is a package of eight subroutines for the numerical solution of the initial value problem for systems of first order ordinary differential equations whose Jacobian matrices are banded or can be approximated by band matrices. The package can be used for either stiff or non-stiff systems whose Jacobians can be approximated by band matrices. It is especially suited to problems with intermittent high-speed transients or waves. EPISODEB is best suited to problems with intermittent high-speed transients or waves. Smooth or linear problems can lead to high overhead costs. Current dimensioning allows for 100 simultaneous equations. (ERA citation 08:028704)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 102K bytes are used to execute the double-precision version of the sample problem.

THI3D; Thermal-Hydraulic Multichannel Analysis.
W. T Sha.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-706 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048706 Price code: CP T13

THI3D is a computer program for steady-state, single-phase, thermal-hydraulic multichannel analysis. The model accounts for conservation of mass, energy, and momentum (both axial and transverse) subject to pressure-drop boundary conditions and leads to a nonlinear, multipoint boundary-value problem. Turbulent interchange, radial thermal conduction, and forced flow due to the wire wrap or grid between channels are explicitly taken into account. Temperature distributions in the coolant, cladding, fuel, and duct wall, and the size of the central void of the oxide fuel after thermal restructuring are computed. Three different thermal-hydraulic channel arrangements (square, hexagonal, and triangular) can be treated. Multipin analysis with transverse interactions, or multiassembly calculations without transverse interactions between the channels, can be performed. Problems of partial flow blockage (porous blockage) can be analyzed, and the effect on the redistribution of the inlet mass velocity can be taken into account. Maximum of 217-pin bundle problem with unlimited axial steps. A lumped-parameter approach is assumed valid, i.e., a reactor channel may be either a fuel pin or a fuel assembly with associated coolant. All system parameters within a channel at a given elevation are uniform and radially isotropic. (ERA citation 08:026070)...Software Description: IBM370; FORTRAN IV; OS/MVT; 260K bytes storage (for 19-pin bundle) and 2 scratch disks or tapes.

CREEP-PLAST; Two-Dimensional Inelastic Structural Analysis.
Y. R. Rashid, and J. A. Clinard.
General Electric Co., San Jose, CA. Nuclear Fuels Dept.
1984, mag tape ANL/NESC-707R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048707 Price code: CP T13

CREEP-PLAST is a two-dimensional finite-element program for creep and plasticity analysis of metal structures operating at high temperature. The technique employed considers instantaneous time-independent elastic-plastic and time-dependent creep simultaneously in an incremental procedure which requires the user to select his own discrete time and/or load increments. The method of calculation is based on the assumption that the total strain at any instant consists of elastic, plastic, and creep parts with essentially no interdependence between the plastic and creep components. CREEP-PLAST is capable of predicting deformations, stresses, and total accumulated strains as functions of time and/or load for user-specified thermal and mechanical loadings which can be varied independently. The program can be used to analyze plane or axisymmetric structures. Two post-processor graphics programs use plot output files from CREEP-PLAST to display the time and/or mechanical load histories of nodal displacement, stress, strain, and temperature (HISTORY-PLOT) or contour lines of whole field deformations and stress, strain, or temperature (CONTOUR-PLOT). Maxima of 900 nodes 1800 elements 200 solution increments. (ERA citation 08:028705)...Software Description: IBM360,370; FORTRAN IV (95%) and BAL (5%); OS/360,370 Level 21.6; A maximum of 400K bytes of memory is required for out-of-core solutions. Size may vary up to 1500K bytes for in-core solution of larger problems. An overlay system is used and significant scratch storage space is required for large problems. CREEP-PLAST executed in approximately 750K bytes of storage, as it is presently configured, in a non-overlay format. The plotting programs HISTORY-PLOT and CONTOUR-PLOT each execute in less than 170K bytes of storage.

WIGL3; One-Dimensional Space-Time Diffusion with Feedback.
A. V. Vota, N. J. Curlee, Jr., A. F. Henry, and L. D. Eisenhart.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-708R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048708 Price code: CP T12

WIGL3 is a program for the steady-state and transient solution of the one-dimensional, two-group, space-time diffusion equations. The program will treat slab, cylindrical, and spherical geometries and includes nonboiling heat transfer. Control rod motion and control system feedback based on total core power or outlet coolant temperature can be simulated. Transients may be excited by prescribed changes in inlet coolant temperature, coolant flow rate, or rod position. For the steady-state option, criticality may be achieved by adjusting control rod position, reference coolant density, or reference fuel temperature. No restrictions are placed on single param-

eters related to problem size. The total amount of storage set aside for all parameters is 14,000 memory locations. (ERA citation 08:026155)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.3; 154,000 (octal) central memory words and one disk for storage of permanent files. The number of central memory words required could be decreased by decreasing the amount of storage set aside for parameters. This would also further limit problem size. If the ability to store data on disk for succeeding WIGL3 problems is not desired, the disk is not needed.

NIXLIN; Least Squares Fit to Nonlinear Forms.
L. M. Arnett.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-709 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048709 Price code: CP T03

NIXLIN performs a function minimization by a direct search iterative process that has the advantage of requiring no derivative evaluations. This particular version is well-suited to fitting nonlinear models to experimental data and to the solution of systems of nonlinear simultaneous equations. (ERA citation 08:028706)...Software Description: IBM360; FORTRAN IV; OS/360; The program requires 240K bytes to compile, 76K bytes to execute.

HAMOC; Fluid Hammer Analysis of Piping System.
H. G. Johnson.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-710 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048710 Price code: CP T11

HAMOC determines the pressure transients in piping systems attached to a reactor vessel which has been perturbed, by a hypothetical core disruptive accident (HCDA) for example. The continuity and momentum equations are solved. The energy equation is not programmed, but simplified column separation logic is included to treat vapor pressures below saturation. This simplified approach has been checked against experimental data. HAMOC was written specifically for problems in which forcing pressures are known as a function of time at certain end boundary conditions, rather than as a general purpose code for the solution of pump coastdown or valve closing problems. (ERA citation 08:026252)...Software Description: CDC6600,7600,CYBER74-18; FORTRAN IV; SCOPE 3.4.2 (CYBER74-18), SCOPE 3.4.4 (CDC6600), SCOPE 2.1.3 (CDC7600); A 131K machine is required with dummy plot routines; HAMOC requires 101,000 (octal) words of storage. A tape is used to store data for offline plotting.

GEOCOST-BC; Binary Cycle Geothermal Cost Study.
H. D. Huber, C. H. Bloomster, and R. A. Walter.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-711 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048711 Price code: CP T15

GEOCOST calculates the cost of generating electricity from geothermal energy. The version of GEOCOST in this release, GEOCOST-BC, simulates the production of electricity using a binary fluid cycle based upon a hydrothermal resource. Current array dimensions provide for a maximum well field size of 625 wells and maximum operating period of 50 years from reservoir exploration through the economic life of the power plant. (ERA citation 08:025912)...Software Description: CDC6600,CYBER74; FORTRAN IV; SCOPE 3.4.3; At least 55K (decimal) memory.

WREM-TOODEE2/MOD3; Two-Dimensional Time-Dependent Fuel Element Study.
G. N. Lauben.
Nuclear Regulatory Commission, Washington, DC. Div. of Systems Safety. 1984, mag tape ANL/NESC-712 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048712 Price code: CP T14

WREM-TOODEE2 is a two-dimensional, time-dependent, fuel-element thermal analysis program. Its primary purpose is to evaluate fuel-element thermal response during post-LOCA refill and reflood in a pressurized water reactor (PWR). WREM-TOODEE2 considers only axisymmetric geometry although the equations for slab and polar geometry are included in the program. (ERA citation 08:026036)...Software Description: IBM360,370;CDC7600,CYBER175; FORTRAN IV; OS/360.370 (IBM370), SCOPE 2.4 (CDC7600), NOS 1.3 (CDC7600); 315K bytes (IBM370); 143,000 (octal) words (CDC CYBER175).

SYN3D; Single-Channel Flux Synthesis Diffusion.
C. H. Adams.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-713 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048713 Price code: CP T15

SYN3D solves the direct and adjoint, diffusion theory, static eigenvalue equations in two and three dimensions. The geometries available are x-y, r-z, x-y-z and triangular-z. The only serious limitation is on the product of the number of groups and the maximum number of expansion functions used at any particular axial elevation. (ERA citation 08:028707)...Software Description: IBM370/195;CDC7600; FORTRAN IV (H Extended compiler) and Assembly language (IBM370), FORTRAN IV and COMPASS (CDC7600); OS/370 (IBM370) and SCOPE (CDC7600); The 370 version requires as a minimum 35K full-word storage to execute small problems and runs more efficiently with increased storage capacity. Depending on the complexity of the problem, SYN3D may require up to 45 logical units. To execute the 370's sample problems, 470K words of memory are needed. The 7600 version requires 55,000 (octal) words of small core memory.

SPOOL-FIRE; Spray-Pool Burning of Sodium.
I. Charak, and L. W. Person.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-714R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048714 Price code: CP T09

SPOOL-FIRE calculates the pressure and temperatures within a containment building as a result of a sodium fire. The fire is

assumed to occur in two distinct phases: a spray and a pool. The spray fire is conservatively assumed to occur instantaneously. The code calculates all important temperatures, accounting for heat loss from the building to the environment, as well as leakage of the containment atmosphere under conditions of internal overpressure. (ERA citation 08:026253)...Software Description: IBM370; FORTRAN IV and CSMP; OS/370; 178K bytes of memory.

IMPAC2; Edition B; Shipping Container Impact Analysis.
J. B. Payne, and J. Counts.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-715 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048715 Price code: CP T09

IMPAC2 solves the equations of motion for a one-dimensional, lumped-mass, nonlinear spring mathematical container model. The program was designed to analyze the dynamic response of metallic shipping containers impacting an unyielding surface. The container may consist of several hollow concentric cylinders, each of a different material and length. The maximum number of masses is 100. Maximum of 10 different materials. The first seven are: steel, clad lead, uranium, pine, lead, balsa, and marine plywood. (ERA citation 08:028708)...Software Description: CDC7600,6600; FORTRAN IV; LASL CROS Operating System and the CDC SCOPE; 55,000 (octal) words of memory are required on the CDC7600 and 70,000 (octal) words of memory on the CDC6600 for execution, along with a card-image input unit and a printer.

SPRAY3; Sodium Spray Release Safety Analysis.
P. R. Shire.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-716 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048716 Price code: CP T09

SPRAY3 performs the calculations of thermodynamics, heat and mass transfer, and combustion of sodium spray droplets released in an LMFBR cell as a result of postulated piping failure. Droplet motion and large sodium surface area combine to produce rapid heat release and pressure rise within the enclosed volume. Present verification of the code against experimental evidence limits the droplet size range to 0.01 to 0.30 inch with oxygen concentrations ranging from 0 to 21 percent. The number of space increments should be in the range of 1 to 50 for stability and accuracy. (ERA citation 08:026254)...Software Description: CDC CYBER74;CDC6600,7600; FORTRAN; SCOPE 3.4; An input device to read cards or card-image input data and output devices for paper and microfiche copy of digital information and micrographic for plot output are utilized. These requirements may be easily modified.

NAHAMMER; Fluid Hammer Analysis Piping System.
W. L. Chen, D. H. Thompson, Y. W. Shin, and H. S. Edwards.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-717 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048717 Price code: CP T09

NAHAMMER analyzes short-term pressure-pulse transients in a closed hydraulic system consisting of series or parallel piping, pipe junctions, diameter discontinuities, elbows, junctions of three to six branches, orifices, accoustic-impedance discontinuities, dummy junctions, dead ends, and free surfaces in surge tanks. The working fluid is assumed to be sodium without cavitation. The program currently provides for maxima of: 50 legs 120 nodes per leg 50 junctions 10 plenums (surge tanks). The assumption of linearity restricts the maximum pressure at any propagating wave front in sodium to about 5800 psi. Calculations are limited to liquid sodium in the absence of cavitation. (ERA citation 08:026255)...Software Description: IBM360,370;CDC6600,7600; FORTRAN IV; OS/360,370 (IBM360,370), SCOPE 3.4.3 (CDC6600), or SCOPE 2.1.2 (CDC7600); 362K bytes (IBM360,370), or 126,000 (octal) words (CDC6600,7600) of storage.

NATRANSIENT; Fluid Hammer Analysis One-Dimensional Piping.
Y. W. Shin.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-718 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048718 Price code: CP T09

NATRANSIENT analyzes short-term pressure-pulse transients in a closed hydraulic system consisting of series or parallel piping, pipe junctions, diameter discontinuities, junctions of three to six branches, closed ends, surge tanks, far ends, dummy junctions, acoustic impedance discontinuities, and rupture disks. The working fluid is assumed to be liquid sodium without cavitation. The source pressure pulse is assumed to be generated by a sodium-water reaction according to the dynamic model of Zaker and Salmon. The program currently provides for maxima of: 50 legs 120 nodes per leg 50 junctions 10 surge tanks. Cavitation is assumed to be absent. To specify a working fluid other than sodium, the source program must be changed. (ERA citation 08:026256)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 166K bytes of storage are required.

NATRAN2; Fluid Hammer Analysis One-Dimensional and Two-Dimensional Systems.
Y. W. Shin, and R. A. Valentin.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-719 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048719 Price code: CP T11

NATRAN2 analyzes short-term pressure-pulse transients in a closed hydraulic system consisting of a two-dimensional axisymmetric domain connected to a one-dimensional piping network. The one-dimensional network may consist of series or parallel piping, pipe junctions, diameter discontinuities, junctions of three to six branches, closed ends, surge tanks, far ends, dummy junctions, acoustic impedance discontinuities, and rupture disks. By default, the working fluid is assumed to be liquid sodium without cavitation; but another working fluid can be specified in terms of its density, sonic speed, and viscosity. The source pressure pulse can arise from one of the following: a pressure-time function specified at some point in the two-dimensional domain, a pressure-time

function or a sodium-water reaction specified at some point in the one-dimensional domain. The pressure pulse from a sodium-water reaction is assumed to be generated according to the dynamic model of Zaker and Salmon. Maxima of: 1 two-dimensional cylindrical region, 30 grid points in the r-direction, 60 grid points in the z-direction, 50 one-dimensional pipe branches, 120 nodes per pipe branch, 50 junctions, and 10 surge tanks. Cavitation is assumed to be absent. In the two-dimensional analysis, viscosity effects are neglected. (ERA citation 08:026257)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 452K bytes of storage are required. If plotting information is to be written on logical unit 10, a disk or tape unit is needed for this purpose.

RICE-LASL; Chemically Reactive Mixture Flow.
W. C. Rivard, O. A. Farmer, and T. D. Butler.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-720 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048720 Price code: CP T11

The fluid dynamics of chemically reactive mixtures are calculated at arbitrary flow speeds with the RICE-LASL program. Application is made to continuous wave HF chemical lasers to compute the supersonic mixing and chemical reactions that take place in the lasing cavity. (ERA citation 08:026804)...Software Description: CDC7600,6600; FORTRAN IV; LASL CROS system.

WFLLL2B; Wire Configuration Frequency Domain.
D. L. Lager, R. J. Lytle, and G. A. Burrel.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-721 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048721 Price code: CP T12

WFLLL2B solves the problem of electromagnetic radiation from wire structures in free space or in the presence of a lossy half-space, including structures penetrating the interface. Antenna structures may be composed of many interconnected wires of differing radii, which may be impedance loaded. Electric space and surface wave fields may be evaluated. At least six current samples/wavelength should be used in setting up a numerical model, and the segment-length to wire-radius ratio should be greater than 5 for the thin-wire approximations to be valid. The two geometric optics ground treatment methods and Norton's formulas are valid only for structures located in the upper half-space. No more than 300 segments can be processed. (ERA citation 08:028709)...Software Description: CDC7600; The program was written originally in LRLTRAN and converted to FORTRAN; SCOPE.

CRAC; Calculation of Reactor Accident Consequences.
R. M. Blond.
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research. 1984, mag tape ANL/NESC-722 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048722 Price code: CP T16

The CRAC code was developed in support of the Reactor Safety Study (WASH-1400) to assess the risk from potential accidents at nuclear power plants. (ERA citation 08:026258)...Software Description: IBM360,370; FORTRAN IV; OS/VS2 Release 3.7A (IBM370), OS/MVT (IBM360); The program requires 190K when overlayed on the IBM360/370, and over 300K if not overlayed. Disk files should be available. Tapes may be substituted but will degrade the execution time substantially.

SOLA-ICE; Transient Compressible Fluid Flow.
L. D. Cloutman, C. W. Hirt, and N. C. Romero.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-723 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048723 Price code: CP T03

SOLA-ICE is a numerical solution algorithm for transient, arbitrarily compressible fluid flows. A simple equation of state and constant diffusion coefficients are assumed, and there is no provision for internal obstacles. (ERA citation 08:027051)...Software Description: CDC7600,6600; FORTRAN IV; CROS, SCOPE, KRONOS, and NOS.

MOBY; Mobile Home Heating and Cooling Energy Use.
J. V. Wilson.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-724 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048724 Price code: CP T09

MOBY calculates daily heating and cooling energy requirements for a mobile home, or other structure of light construction and box-like shape, using hourly weather data from tapes available from NOAA, the National Oceanographic and Atmospheric Administration. The interior of the building must be considered as a single space. The building must be rectangular in horizontal cross section. (ERA citation 08:026534)...Software Description: IBM360/75,360/91; FORTRAN IV; OS/360; 82K bytes of storage, a tape unit, card reader and printer are required for execution of the program as written.

JCLCROSS; DSN Cross-Reference List from JCL PROCLIBS.
J. Amick.
Hallmark Cards, Inc., Kansas City, MO. 1984, mag tape ANL/NESC-725 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048725 Price code: CP T09

The JCLCROSS program scans PROCLIBs and produces a cross-reference listing of DSNAME, PROGNAME, STEPNAME, DISP, UNIT, and PGM parameters. The list may be sorted as desired and passed to the JCLCROSP program for printing with page headings. 150 symbolic parameters defined in the PROC statement. (ERA citation 08:028710)...Software Description: IBM360,370; FORTRAN, Assembler, and COBOL are used. The MAIN and BUILD routines are written in FORTRAN. Subroutines FPARM, KOMSTR, STRMOV, GETDD, GETMEM, READL, FINDCH, and UVFW20 are written in BAL. JCLCROSP is an auxiliary COBOL routine; OS/VS/MVS, FORTRAN G or H, UTILITY SORT, ANS COBOL, Assembler; The NESC ran the program using 94K bytes of memory.

NAIAD; Compressible Two-Phase Coolant Behavior.
G. D. Trimble, and W. J. Turner.
Australian Atomic Energy Commission, Sutherland. 1984, mag tape ANL/NESC-726 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048726 Price code: CP T15

NAIAD computes the transient (including LOCA) and steady-state flow of two-phase compressible light water in a network of heated channels. The momentum flux term is included and unequal phase velocities allowed. A lumped fuel model and detailed surface heat transfer are included. Thermodynamic equilibrium of the two phases is assumed. Discharge flow is calculated intrinsically from the hydraulic equations. The ANC pump model is included. Versions of the program can be easily generated to handle any size problem. The standard NAIAD code is limited to 50 axial nodes and 10 channels. (ERA citation 08:027052)...Software Description: IBM360; FORTRAN IV (H OPT2) and Assembly language; OS/360 MVT; 240K bytes of main storage and a 132-column printer are required.

K-FIX; Transient Two-Dimensional Two-Phase Flow.
W. C. Rivard, and M. D. Torrey.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-727 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048727 Price code: CP T11

The transient dynamics of two-dimensional, two-phase flow with interfacial exchange are calculated at all flow speeds. Each phase is described in terms of its own density, velocity, and temperature. Separate sets of field equations govern the gas and liquid phase dynamics. The six field equations for the two phases couple through mass, momentum, and energy exchange. (ERA citation 08:027053)...Software Description: CDC7600; FORTRAN IV; SCOPE; The sample problem, excluding plotting routines, took less than 22,000 words of storage.

SLIDES; For DISSPLA-Lettered Slides and Posters.
R Bertrand.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-728 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048728 Price code: CP T09

The SLIDES program takes text and commands as input and prepares lettered slides and posters, utilizing the DISSPLA graphics subroutines to generate its output. The program automatically selects the character-size so that the text fills the designated area. The ANL-AMD plotter subroutines permit the output to be displayed on an interactive graphics terminal or alternatively directed to any AMD plotter. The SLIDES program does not limit the number of slides nor the number and complexity of posters produced in a single run; however, local system parameters may impose such limitations. (ERA citation 08:028711)...Software Description: IBM360,370; FORTRAN IV; OS/360 (IBM360), OS/370 (IBM370); 250K bytes of storage, DISSPLA software and appropriate plotting devices.

DYNDSK; Optimal Disk Data Set Reordering.
F. C. Fortune.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-729 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048729 Price code: CP T09

DYNDSK optimizes the placement of data sets on an IBM 3330/2314 disk pack to reduce seek time (arm travel) and forecast improvement expected after reorganization. Data sets are theoretically reordered based on size and number of references. With known percentages of seeks between data sets the program computes the average number of cylinders traveled per seek. Input data consists of addresses captured by a DYNAPROBE 8000 hardware monitor and specification of the present location of the data sets. Only one disk pack can be analyzed at a time. (ERA citation 08:028712)...Software Description: IBM360,370; FORTRAN IV and BAL; OS/VS2 Release 3.7A (IBM370), OS/MVT (IBM360); 58K core storage for execution.

HETRAP; Fuel Rod Response LOCA Experiments.
S. Malang, and R. A. Hedrick.
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). 1984, mag tape ANL/NESC-730 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048730 Price code: CP T09

HETRAP is a heat transfer analysis program developed for use in the evaluation of LOCA experiments. Its major application is calculation of heat flux and heat transfer coefficients at the surface of an electrically-heated rod during a fast transient, using measured temperatures in the rod. In addition, the code can be used to calculate the steady-state and transient temperature fields in fuel rods and electrically-heated rods for given heat transfer coefficients. Maxima of 10 cross sections 50 nodes in each cross section 50 materials in each cross section 1000 variable pairs in transient calculations. (ERA citation 08:026259)...Software Description: IBM360/75,360/91; FORTRAN IV; OS/360; Approximately 260K bytes storage, a tape unit, card reader, and printer are required.

SUPORT; Solution of Boundary-Value Problems.
M. R. Scott, H. A. Watts, and L. Eyberger.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-731 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048731 Price code: CP T11

SUPORT solves a system of linear two-point boundary-value problems subject to general separated boundary conditions. The boundary-value problem must be linear and the boundary conditions must be separated. The number of equations which can be solved is dependent upon the main storage available. (ERA citation 08:028713)...Software Description: CDC6000-7000;IBM370,303x; FORTRAN IV; SCOPE 3.3 (CDC6600), OS/370 (IBM370); 5500 (octal) words (CDC6600), 116K bytes.

LOCK; Few-Channel Coolant-Flow Blockage Study.
A. Ohtsubo.

Power Reactor and Nuclear Fuel Development Corp., Tokyo (Japan). 1984, mag tape ANL/NESC-732 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048732 Price code: CP T11

LOCK was developed to study the problem of local blockage of coolant flow in a few channels in a fast breeder reactor. The program is designed to perform thermal calculations in the steady state and to calculate the transient behavior in temperature of the coolant and cladding. The heat transfer which is taken into account includes heat transmission mixing, thermal conduction, and cross flow. Maxima of 30 total number of channels, claddings, and fuels; 15 channels (NCH); 15 claddings (NSF); 5 blocked channels (IBLOCK); 100 mesh points in axial direction; 20 mesh points in flowrate restoring part (MSLX); 10 print spaces (LPRINT); 50 prints for arrangement; 100 time-steps. (ERA citation 08:026071)...Software Description: FACOM230;IBM360,370; FORTRAN IV; OS2/VS (FACOM), OS/360 (IBM360); 240K memory, card reader, tape drive, line printer.

RELAP3B/MOD110; Reactor System Transient Code.
A. Aronson.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-733 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048733 Price code: CP T15

RELAP3B describes the behavior of water-cooled nuclear reactors during postulated accidents or power transients, such as large reactivity excursions, coolant losses or pump failures. The program calculates flows, mass and energy inventories, pressures, temperatures, and steam qualities along with variables associated with reactor power, reactor heat transfer, or control systems. Its versatility allows one to describe simple hydraulic systems as well as complex reactor systems. RELAP3B allows a maximum of 75 volumes connected by a maximum of 100 junctions, with no restrictions as to the order of these connections. However, these maxima may be increased to far greater limits on a large computer. (ERA citation 08:026260)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1; 153,000 (octal) words of central memory and 154,000 (octal) words of large core memory are required.

MARCH1.1; LWR Meltdown Accident Response Model.
R. O. Wooton.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-734 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048734 Price code: CP T14

MARCH1.1 calculates primary system and containment response to small or large pipe breaks and transient accidents, which when combined with failure of engineered safety features can lead to core meltdown in water cooled reactors. The containment can be divided into up to 8 interconnected compartment volumes. Engineered safety features which can be modeled include ECCS, containment sprays, containment building coolers, containment fans, PWR ice condensers, BWR pressure suppression pools, and ECC and containment spray recirculation heat exchangers. (ERA citation 08:026261)...Software Description: CDC CYBER74,73,175;CDC6500; FORTRAN IV (92%) and COMPASS (8%). MARCH1.1 was developed using CDC FORTRAN Extended; NOS/BE 1.4 (CDC CYBER74) and NOS 1.3 (CDC CYBER175); MARCH1.1 requires approximately 215K (octal) words of memory for execution.

PIRAX2; Simplified Inelastic Piping Analysis.
E. C. Rodabaugh, and J. A. Clinard.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-735R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048735 Price code: CP T11

PIRAX2 estimates displacements, stresses, and strains for spatially three-dimensional piping systems subjected to elastic-plastic-creep behavior. The piping system must not contain loops. Maxima of 100 nodal points, 10 materials, and 20 time-step intervals are permitted. (ERA citation 08:028714)...Software Description: CDC6400; FORTRAN IV; SCOPE 3.4.1 Level 373; 100,000 (octal) words of memory.

BIOSSIM; Biochemical Kinetic Simulation System.
D. Garfinkel.
Moore School of Electrical Engineering, Philadelphia, PA. 1984, mag tape ANL/NESC-736 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048736 Price code: CP T14

BIOSSIM determines the time course of chemical reactions in chemical (or biochemical) systems. The user inputs a description of the chemical reactions of the system with initial chemical concentrations and reaction rate constants. The program calculates the concentrations of these chemicals as a function of time. While the simulation program is designed for chemical systems, it has features which facilitate the ability to work with distribution equations for enzyme forms. The simulation program may also be applied to other areas where appropriate. It has been applied to compartmental analysis of radioactive tracer data in physiological modeling and interacting animals in ecological systems. In general, this program can be used as a differential equation solver for any set of simultaneous linear or nonlinear differential equations of first and higher orders. The generator and simulator programs are set up for: 200 chemicals 200 reactions 50 stoichiometries 12 chemicals per reaction 50 enzyme forms. If the user wants to simulate larger systems, the appropriate array dimensions must be modified in the generator program. (ERA citation 08:027524)... Software Description: IBM360,370; FORTRAN (99%) and Assembler (1%); OS/360 (IBM360), OS/370 (IBM370); 155K of memory for execution.

DIFFUSER; Two-Dimensional Subsonic MHD Diffuser Performance.
E. Doss, and H. Geyer.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-737 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048737 Price code: CP T09

The DIFFUSER program uses a turbulent-flow model to calculate the performance of two-dimensional subsonic diffusers

and of three-dimensional diffusers under the assumption of similarity of the top, bottom, and side wall boundary layers. The code cannot handle properly 1) the modeling of the turbulent Reynolds stress in an adverse pressure gradient with large boundary layers, 2) interaction corner effects of the boundary layers on the four walls of the channel, 3) transitionary stall and 4) separated flow. (ERA citation 08:026522)...Software Description: IBM370; FORTRAN IV; OS/370 MVT/ASP system with ANL-AMD function library, SYS1.FORTLIB2; 125K bytes of memory.

ARSTEC; Nonlinear Mixed Integer Optimization.
D. M. Rasmuson, and N. H. Marshall.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-738 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048738 Price code: CP T03

The ARSTEC program was written to solve nonlinear, mixed integer, optimization problems. An example of such a problem in the nuclear industry is the allocation of redundant parts in the design of a nuclear power plant to minimize plant unavailability. Presently, the maximum number of independent variables allowed is 10. This can be changed by increasing the dimension of the arrays. (ERA citation 08:026135)...Software Description: IBM360,370; FORTRAN IV; OS/MVT; Card reader, printer, and 125K bytes of memory.

PRP; Product Price Calculated by DCF Method.
R. Salmon.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-739 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048739 Price code: CP T09

PRP calculates the production cost (product price) when the investments, operating costs, interest rate on debt, rate of return on equity, tax rates, by-product values, and similar related information are supplied. The program can also be used to calculate the rate of return on equity when the selling price of the product is supplied. Maxima of 400 years of project life (NYRS) 24 products listed (NPRODS) 24 feedstocks for which the price and rate are given (NFEEDS) 24 depreciation classes (NCLS) 24 years of construction period (NCNSTR) 20 rates of return on equity (NEQMAX). (ERA citation 08:028715)...Software Description: IBM360,370; FORTRAN IV; OS/360; 92K bytes.

PLACRE; FEM Inelastic Structural Analysis.
W. K. Sartory.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-740R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048740 Price code: CP T13

PLACRE is a two-dimensional (plane stress or axisymmetric) elastic-plastic-creep finite element structural analysis program. It has been adapted to analyze one-dimensional pipe-wall problems in which the stress, strain, and temperature depend only on radius. In addition to structural analysis capabilities, PLACRE has facilities for carrying out simultaneous transient thermal analysis for pipe-wall problems. Maxima of 1000 elements and 1000 nodes for general two-dimensional problems and 16 elements and 16 nodes for pipe-wall problems. (ERA citation 08:028716)...Software Description: IBM360,370; FORTRAN IV; OS/MVT (IBM360), OS/370 (IBM370); About 187,000 double-precision (8 byte) words of storage are required in the general-purpose model for the solution of moderate-sized problems. About 35,000 double precision words of storage are required for pipe-wall problems. 1450K bytes were required for NESC execution of the general-purpose model, 280K bytes for the pipe-wall one.

TRIDENT; Two-Dimensional Multigroup Transport Triangular Mesh.
T. J. Seed, W. F. Miller, Jr., and F. W. Brinkley, Jr.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-741 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048741 Price code: CP T14

TRIDENT solves the two-dimensional, multigroup transport equations in rectangular (x-y) and cylindrical (r-z) geometries using a regular triangular mesh. Regular and adjoint, inhomogeneous and homogeneous (keff and eigenvalue search) problems subject to vacuum, reflective, white, or source boundary conditions are solved. General anisotropic scattering is allowed and anisotropic distributed sources are permitted. Variable dimensioning is used so that any combination of problem parameters leading to a container array less than MAXLEN can be accommodated. On IBM machines TRIDENT executes in double-precision (8 bytes per word) so that MAXLEN can be on the order of 100,000 or more. On CDC machines MAXLEN can be about 40,000 words of small core memory (SCM) and large core memory (LCM) is used for most group-dependent data. (ERA citation 08:028316)...Software Description: CDC7600; IBM360,370; FORTRAN IV (TRIDENT source and routines) and IBM360 Assembler (subroutines ABEND, DATE, SECOND, TIME, TRACER, CONVO, and CONVI); OS/360 MVT (IBM360), SCOPE (CDC7600); A maximum of three interface file units open at one time and three system input-output units are required. One random disk unit required if the automatic data overflow option is used. 730K bytes of memory are necessary to execute the sample problems on the IBM system. The amount of memory needed is problem-dependent. A LCM block of 131,064 words was needed to execute the sample problems on the CDC7600.

CASIM; Simulates Hadronic Cascade Transport.
A. Van Ginneken.
Fermi National Accelerator Lab., Batavia, IL. 1984, mag tape ANL/NESC-742 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048742 Price code: CP T13

CASIM is a Monte Carlo program to study the average development of high energy cascades in large targets (shields) of arbitrary geometry and composition. The program is best suited for incident energies in the range 20-1000 GeV. The program does not study transport of low momentum particles (less than or equal to 0.3 GeV/c). (ERA citation 08:028317)...Software Description: IBM370,360; FORTRAN IV; OS/370,360; 350K of memory, tape drives, line printer.

PARK1; Nuclear Reactor Power Plant Analysis.

W. G. Clarke, and J. V. Reihing.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-743R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048743 Price code: CP T17

PARK1 is a computational tool for the analysis of the interrelated thermal, hydraulic, and nuclear characteristics of a pressurized water nuclear reactor plant under a variety of steady-state and transient conditions. The program will simulate the overall plant dynamic response to changes in plant conditions such as turbine load, motion of control rods, and main coolant pump switching. Specific transients might include plant maneuvers, loss of load, complete or sequential loss of primary coolant flow, cold water accidents, and startup or power range rod withdrawal accidents. Under more general classes of plant transients, PARK1 can simulate reactor protection performance or anticipated transients without scram (ATWS). PARK1 also provides forcing functions for more detailed studies of isolated system components such as hot channels, steam generators, and pressurizers. The features of PARK1 include a steady-state (initial condition) calculation, flexible reactor core configuration to permit 1, 1-1/2, or 2 pass cores with multiple channel regions per pass, separable space-time reactor kinetics including the effects of decay heat, coolant within-core leakage, up to four primary coolant loops, response of reactor plant control systems such as reactor protection and steam generator feedwater control, and graphical display of transient plant variables. Up to 15 channel regions, 8 leakage paths, and four interpass ducts may be used to describe the reactor core. A maximum of four loops and eight steam generator tube bundle regions is permitted. (ERA citation 08:026037)...Software Description: CDC7600,6600; FORTRAN IV; SCOPE 3.1.5 (CDC6600), SCOPE 1.1 (CDC7600); CDC6600 - 140K octal locations of central memory and 300K of extended core storage; CDC7600 - 150K of central memory and 300K of extended core storage; as well as punching and curve plotting capability.

CORRAL2; Radionuclide Containment after LOCA.
P. Cybulskis.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-745 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048745 Price code: CP T11

CORRAL2 describes fission product behavior in multicompartment LWR containments taking into account natural transport and deposition as well as the effects of engineered safety features. This program is specifically designed to handle fission product behavior in LWR accidents involving core meltdown, though less severe accidents can also be treated. The containment system can be described by up to 15 individual compartments; the accident sequence is described by up to 20 sequential event times. Radionuclide release by any of four release mechanisms for each of 8 groups of fission products can be specified. (ERA citation 08:026262)...Software Description: CDC6400,CYBER73; FORTRAN IV; NOS/BE; 137,700 (octal) 60-bit words of central memory and 52,000 (octal) 60-bit words extended core are used. The program output prints 136-character records.

EURCYL1; Cylinder-Cylinder Intersection Mesh Generator.
A. L. Snow, and P. Bell.
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div. 1984, mag tape ANL/NESC-746R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048746 Price code: CP T09

EURCYL1 produces a finite-element model of a cylinder-cylinder intersection for any of a number of general-purpose, thermal-structural computer programs including ANSYS, MARC, MATUS (NESC Abstract 597), and WECAN. The mesh is created using three-dimensional solid elements. Node and element descriptions are generated in punched card or data file format. (ERA citation 08:028717)...Software Description: CDC7600; FORTRAN IV; SCOPE 2; Less than 100K words of storage are required. EURCYL1 expects to read input from TAPE5, to write print output on TAPE6, punch output to TAPE7, and to store data on TAPE8 and TAPE9, except with the MAM (MATUS-APACHE-MESH3D) option when all the data is stored on THREED.

LINEAR;SIGMA1; Linearize and Broaden ENDF/B Data.
D. E. Cullen.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-747 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048747 Price code: CP T09

LINEAR and SIGMA1 are FORTRAN programs designed to convert ENDF/B File 3 cross section data to linear-linear interpolatable form, to thin these data, and to Doppler-broaden linear-linear data to one final temperature. The output is written in ENDF/B format. LINEAR converts evaluated cross sections in the ENDF/B format to linear-linear interpolatable form and thins those sections already in that form. This eliminates any subsequent code's need to do this task. SIGMA1 will Doppler-broaden the converted sections of ENDF/B File 3 cross-section data to the final temperature. The energy grid is selected to ensure that the broadened data is linear-linear interpolatable. If the original data is not at zero Kelvin the data are broadened by the effective temperature difference to the final temperature. The programs use only the ENDF/B BCD format tape, and copy all sections except File 3 as read. Since File 3 data are in identical format for ENDF/B Versions I through V these programs can be used with all of these versions. The input to SIGMA1 must be data which vary linearly in energy and cross section between tabulated points. (ERA citation 08:028140)...Software Description: CDC7600,6600; FORTRAN IV; SCOPE 2.1. Approximately 25K words of memory are required.

DRAFTMAN; Draw Figures and Graphs with DISSPLA.
M. D. Gawlik.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-748 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048748 Price code: CP T09

DRAFTMAN is a FORTRAN DISSPLA-based program that allows the user to obtain drawings of simple graphs. Figures are developed interactively on a graphics terminal, with the terminal user prompted for responses describing the figure

being developed. When user/terminal interaction is completed the figure is drawn on the screen for review. The user can then submit a batch job directing the output to a plotting device for a high-quality drawing of the figure. The program can be utilized completely in a batch mode, if desired. The maximum number of curves that can be drawn on one point is six. The maximum number of data points that can define any curve is thirty. (ERA citation 08:028718)...Software Description: IBM360,370; FORTRAN IV; OS/360 and TSO (IBM360), OS/370 (IBM370); 200K bytes of storage, appropriate graphics terminal, and plotting devices.

STEEP4; Thermonuclear Reaction Rates.
D. R. Harris, G. M. Hale, A. A. Husseiny, Z. A. Sabri, and D. E. Dei.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-749 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048749 Price code: CP T11

STEEP4 calculates fusion reaction rates in terms of the specific reactivity (sigma-v) which is the product of cross section and relative velocity averaged over the actual ion distributions of the interacting particles in the plasma. Maxwellian ion distributions are modified to include slowing-down contributions which are characterized in terms of plasma parameters. Rapid and accurate algorithms are used for integrating the specific reactivity from spectra and input cross sections. Options are also provided for rapid calculation of screening effects on specific reaction rates. The form of the slowing-down distribution neglects absorption and leakage of plasma particles during the slowing-down process and is based on the assumption that the slowing-down ion is faster than the background ions but slower than the plasma electrons. Reference report, LA-6344-MS. (ERA citation 08:024758)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE 2.1.3; A SC4020 Film Unit is used to provide film plotting capability.

CURT2; Curved Tubes or Elbows and Attached Pipes.
R. C. Gwaltney.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-750R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048750 Price code: CP T13

CURT2 is a computer code that calculates stresses and displacements in a shell structure made up of curved or straight cylindrical segments such as those in a piping system. Loadings considered are internal pressure and/or arbitrary end loadings that may be distributed symmetrically or nonsymmetrically around the circumference. CURT2 will compute the stress distributions and displacements of generic points in a structure that consists of up to 5 arbitrarily arranged straight and curved cylindrical shells. The thickness of each part, the modulus of elasticity and Poisson's ratio for each part must be constant. Reference report, ORNL-TM-4646. (ERA citation 08:024084)...Software Description: IBM360,370; FORTRAN IV; OS/360; 450K bytes of storage are required.

SOMIX1; Sodium Spray Fires in Cylindrical Cell.
M. P. Heisler, and K. K. Mori.
Atomics International Div., Canoga Park, CA. 1984, mag tape ANL/NESC-751R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048751 Price code: CP T11

SOMIX1 analyzes transient free convection motion in low-oxygen gas environments of a cylindrical enclosure, representing a LMFBR heat transfer cell, following a sodium pipe rupture which releases a spray of sodium droplets. Calculated are the combustion and heat transfer from the falling spray to the gas atmosphere, droplet motion, gas temperature and pressure rise and internal gas circulation. Maximum of 5 different drop sizes for fast fourier transform problems - (NMAX(JMAX-1)ND).LE.18000 (IMAXJMAX).LE.297 where NMAX = number of drop release time-steps, JMAX =. number of radial mesh points, IMAX = number of axial mesh points, and ND = number of different drop sizes. (ERA citation 08:023508)...Software Description: IBM370; FORTRAN IV H Extended; OS/370. The sample uses 556K bytes of memory, card reader and line printer (I/O devices 5 and 6), and the SC4020 for film plotting.

OCOPTR;DRVOCR; Unconstrained Optimization.
J. L. Nazareth.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-753 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048753 Price code: CP T11

OCOPTR and DRVOCR are computer programs designed to find minima of non-linear differentiable functions f: R**n---> R with n dimensional domains. OCOPTR requires that the user only provide function values (i.e. it is a derivative-free routine). DRVOCR requires the user to supply both function and gradient information. The functions to which the routine is applied are assumed to be differentiable. The routine also requires (n**2/2) + 0(n) storage locations where n is the problem dimension. Reference reports, TM-303 and TM-306. (ERA citation 08:025233)...Software Description: IBM360,370; FORTRAN IV; OS/MVT; 50K of memory is required.

DEMONR; Unbiased Monte Carlo Slab Shield Code.
J. C. Courtney.
Louisiana State Univ., Baton Rouge. Nuclear Science Center. 1984, mag tape ANL/NESC-754 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048754 Price code: CP T09

DEMONR treats the behavior of neutrons in a slab shield. It is frequently used as a teaching tool. Only one shield may be used in each problem. The shield material may be a single element or a homogeneous mixture of elements with a single effective atomic weight. Only elastic scattering and neutron capture processes are allowed. The source is a point located on one face of the slab. (ERA citation 08:024716)...Software Description: IBM360/65; FORTRAN IV; HASP 3.1; A card reader, tape drives, line printer, and 60K of memory are required.

VARR2; CRBRP 2-Dimensional Transient Fluid Flow Analysis.
J. L. Cook, P. I. Nakayama, and T. Andreychek.
Science Applications, Inc., La Jolla, CA. 1984, mag tape ANL/NESC-755 U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048755 Price code: CP T14

VARR2 is a two-dimensional transient slightly-compressible fluid dynamics program. It solves the complete unsteady Navier-Stokes equation, the energy equation, and the continuity equation in either Cartesian or axisymmetric cylindrical geometry. Slight density variations are accounted for by use of the Boussinesq approximation, which couples the energy and momentum equations. At a cell face, the normal velocity component may be inward, outward, or zero; the tangential velocity component may specify free slip, no slip, or no slip with a turbulent velocity profile. For heat transfer problems, adiabatic or constant heat flux boundary conditions can be specified. By specifying the totality of cell-face boundary conditions in a self-consistent manner, the user can specify a wide spectrum of overall boundary conditions; for example, those called rigid, continuative, periodic, inflow/outflow, or derived. With current dimensioning, the maximum number of cells is about 1600; roughly a 40 x 40 mesh. The problem geometry must be reasonably approximated by a two-dimensional net of rectangular cells. The working fluid may be specified as sodium or water or the properties of the working fluid may be entered as part of the problem input. (ERA citation 08:023509)...Software Description: CDC7600; FORTRAN IV and COMPASS; SCOPE 2.0, SCOPE 2.1.3; 147,000 (octal) words of SCM and 14,400 (octal) words of LCM storage are used. Plotting is done using SD-4060 Stored Program Recording System.

TIMEX; One-Dimensional Time-Dependent Multigroup Discrete Ordinates.
T. R. Hill, and W. H. Reed.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-756 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048756 Price code: CP T12

TIMEX solves the time-dependent, one-dimensional multigroup transport equation with delayed neutrons in plane, cylindrical, spherical, and two-angle plane geometries. Both regular and adjoint, inhomogeneous and homogeneous problems subject to vacuum, reflective, periodic, white, albedo or inhomogeneous boundary flux conditions are solved. General anisotropic scattering is allowed and anisotropic inhomogeneous sources are permitted. Variable dimensioning is used so that any combination of problem parameters leading to a container array less than MAXCOR can be accommodated. In addition, the CDC version permits the use of extended core storage less than MAXECS. Reference report, LA-6201-MS. (ERA citation 08:024717)...Software Description: IBM 360,370;CDC7600; FORTRAN IV; OS/360,370 (IBM360,370), SCOPE 2.1.3 (CDC7600); Use of a container array of 50,000 requires 500K bytes of IBM storage for execution. Five interface units may be required (use is optional), 2 system input/output units and 5 output units are required for the IBM version. Use of a container array of 16,000 and 16,000 words of ECS requires 164K total words of CDC storage for execution. Two system input/output units and 11 additional input/output files are defined in the CDC version.

GNASH; Particle Induced Cross Sections and Spectra.
P. G. Young, and E. D. Arthur.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-757 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048757 Price code: CP T11

The preequilibrium, statistical nuclear model code GNASH calculates reaction and level cross sections, isomer ratios, and spectra (neutron, gamma-ray, and charged-particle) resulting from particle-induced reactions using the Hauser-Feshbach formalism along with simple preequilibrium corrections. Gamma-ray competition is considered in detail for every decaying compound nucleus. The program can handle the decay of up to 10 compound nuclei, each emitting 6 types of radiation. For each nucleus, up to 200 energy bins and 50 discrete levels can be used. A maximum spin of 20 is allowed. (ERA citation 08:024671)...Software Description: CDC7600; FORTRAN and COMPASS; SCOPE; 49K words of small core memory (SCM) and at least 80K words of large core memory (LCM) for problems of reasonable size. The sample problem uses 134K of SCM and 140K of LCM.

COREL;RASE4;DAMG2; Ion Implantation Deposition.
D. K. Brice.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-758 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048758 Price code: CP T11

COREL calculates the final average projected range, standard deviation in projected range, standard deviation in locations transverse to projected range, and average range along path for energetic atomic projectiles incident on amorphous targets or crystalline targets oriented such that the projectiles are not incident along low index crystallographic axes or planes. RASE4 calculates the instantaneous average projected range, standard deviation in projected range, standard deviation in locations transverse to projected range, and average range along path for energetic atomic projectiles incident on amorphous targets or crystalline targets oriented such that the projectiles are not incident along low index crystallographic axes or planes. RASE4 also calculates the instantaneous rate at which the projectile is depositing energy into atomic processes (damage) and into electronic processes (electronic excitation), the average range of target atom recoils projected onto the direction of motion of the projectiles, and the standard deviation in the recoil projected range. DAMG2 calculates the distribution in depth of the energy deposited into atomic processes (damage), electronic processes (electronic excitation), or other energy-dependent quality produced by energetic atomic projectiles incident on amorphous targets or crystalline targets oriented such that the projectiles are not incident along low index crystallographic axes or planes. (ERA citation 08:024718)...Software Description: CDC6600,7600; FORTRAN IV.

CORTES; Thermal and Mechanical Analysis of Tees.
A. N. Gantayat, G. H. Powell, R. E. Textor, B. R. Bass, and H. W. Bryson.
California Univ., Berkeley. Coll. of Engineering. 1984, mag tape ANL/NESC-759 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048759 Price code: CP T15

CORTES is a package consisting of five finite element programs developed for the stress analysis of ANSI BI6.9 tee

joints. The five programs are: SA, the stress analysis program which analyzes pipe joints for the effects of internal pressure and arbitrary combinations of bending moment, torsional moment, axial force, and sheer force on the ends of the branch and run pipes. A limited temperature stress analysis capability is provided. EP, the elasto-plastic stress analysis program which analyzes pipe joints for the effects of internal pressure and arbitrary combinations of forces, including moments, and displacements, including rotations, imposed on the ends of the run and branch pipes. THFA, the transient heat flow analysis program which determines the time history of temperature variations in the pipe joints. Temperature changes are specified at the inner surface, and a heat flow analysis is performed assuming a perfectly insulated outer surface. SHFA, the steady-state heat flow analysis program which determines the steady-state temperature distribution in pipe joints. Temperatures are specified on given cross-sections of the branch and run portions of the tee joint, and the temperature distribution throughout the remainder of the joint is calculated assuming the inner and outer surfaces are perfectly insulated. TSA, accepts as input, the output data from THFA or SHFA and performs the thermal stress analysis on the pipe joints. (ERA citation 08:024085)...Software Description: IBM360,370; FORTRAN IV; OS/360; All five programs use card input and a line printer. Execution of the SA test problem required 960K bytes of memory and 12 scratch disk units. The TSA test case used 880K bytes of memory and 11 scratch disk units.

GRFPAK; Plot Package for CORTES FEM Programs.
P. G. Fowler, and J. W. Bryson.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-760 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048760 Price code: CP T13

GRFPAK is a graphics package written for the CORTES finite-element programs. It includes three plotting routines to assist in analyzing, interpreting, and presenting CORTES results. One plotting routine displays stresses or stress indices by means of contour curves drawn within either the outside or inside surface outline of a quarter section of the tee-joint. Using this routine, one can also obtain plots of the finite-element mesh as viewed from any point in space. A second plotting routine gives a stress versus distance plot along any specified line of nodes. A third routine displays cross-sectional views of the finite-element mesh for both the undeformed (original) and deformed configuration. The deformed configurations are drawn using an exaggerated scale specified by the user. Requests for plots relating to displacements are invalid for CORTES programs TSA, THFA, and SHFA. The maximum value for the variable MTOT in the MAIN program is 22,000. Reference report *RECFM= VBS,BLKSIZE= 3156. (ERA citation 08:024086)...Soft Description: IBM360,370; FORTRAN IV; OS/360; Card reader, tape unit, line printer, and CalComp plotting equipment are required. The amount of memory needed depends on the number of nodes and elements in the finite element idealization. The sample problem which consists of 675 elements required 290K bytes of memory.

PTA1; Pipe System Pressure Analysis.
C. K. Youngdahl, and C. A. Kot.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-761R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048761 Price code: CP T11

PTA1 (Pressure Transient Analysis) performs pressure-transient analysis of large piping networks. The program is particularly oriented toward the analysis of the effects of a sodium/water reaction on the intermediate heat-transport system of a liquid-metal-cooled fast breeder reactor, but may be applied to other pulse sources and piping systems. A variety of junction types are included, and complex piping networks can be treated. The effect of elastic-plastic deformation of piping on pulse propagation, pipe friction and nonlinear velocity terms are included in the formulation. (ERA citation 08:023510)...Software Description: IBM370/195; FORTRAN IV; OS/370. The program requires 300K bytes of memory for execution.

CACECO; LMFBR Containment Accident Analysis.
R. D. Peak.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-762R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048762 Price code: CP T15

The CACECO program predicts the thermodynamic responses of primary and secondary containment to a variety of accidents in a Liquid Metal Fast Breeder Reactor (LMFBR) facility. The user defines these accidents in terms of the following: (a) sodium leakage as spray and spill, (b) air injection, (c) decay heat release, and (d) space cooler operation. CACECO is capable of providing pressure-temperature histories of four cells. Each cell may have connected to it any number of one-dimensional structures which can be used to model walls, floors, or equipment. The structures are linked to the cells or other structures by convective and/or radiative boundary conditions. The structures may be planar, cylindrical, or spherical and can be composed of a number of regions with different properties. Maxima of 25 temperature nodes in each heat structure, 24 heat structures to represent equipment, roofs, walls, and floors of the 4 analysis cells. Reference report, HEDL-TC-859. (ERA citation 08:023511)...Software Description: CDC CYBER74;CDC7600; CDC FORTRAN Extended with only a few statements that do not comply with the American National Standards Institute (ANSI) FORTRAN; SCOPE 3.4.4 Level 414; 120K words (octal) of memory, a tape drive, card reader and line printer are used.

REFLUX; LWR Reflood Heat Transfer Prediction.
W. L. Kirchner.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-763 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048763 Price code: CP T09

REFLUX calculates the temperature-time history of a representative fuel rod during the reflood stage of a hypothetical loss-of-coolant accident (LOCA). The logic used for selection of the appropriate flow regime for analysis of the cladding temperature transient is based on the axial position with regard to the continuous liquid level (based on a mass balance), a liquid carry-over criterion (derived from a force balance on a drop suspended in a vapor stream), and the local cladding surface temperature. A generalized boiling curve is

constructed, and the local flow and clad conditions determine the applicable heat transfer coefficient. REFLUX is expected to provide reasonable results for flooding rates of 0.4 to 10 in/sec, pressures of 15 to 60 psia, peak powers of 0.5 to 1.5 kw/ft, inlet coolant temperatures of 50F to saturation, and initial temperatures of 250 to 2000F. Flow reversals cannot be analyzed with the present version. (ERA citation 08:023445)...Software Description: IBM360; FORTRAN IV; OS/360; Tape unit, line printer, and 100K bytes of memory.

SOERP; Second-Order Error Propagation Code.
N. D. Cox, and C. F. Miller.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-764 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048764 Price code: CP T03

SOERP computes second-order error propagation equations for the first four moments of a function of independently distributed random variables. SOERP was written for a rigorous second-order error propagation of any function which may be expanded in a multivariable Taylor series, the input variables being independently distributed. The required input consists of numbers directly related to the partial derivatives of the function, evaluated at the nominal values of the input variables and the central moments of the input variables from the second through the eighth. The maximum number of component variables allowed is 30. The IBM version will only process one set of input data per run. (ERA citation 08:025234)...Software Description: IBM360,370;CDC7600; FORTRAN IV; OS/360,370 (IBM360,370) and SCOPE (CDC7600); A card reader, tape unit, line printer, and 80K bytes of storage are required for the IBM version; 14,000 (octal) words of SCM are required for the CDC version.

ZONE; Two-Dimensional Finite Element Mesh Generator.
M. J. Burger.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-765 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048765 Price code: CP T11

The ZONE program is a finite element mesh generator which produces the nodes and element description of any two-dimensional geometry. The geometry is divided into a mesh of quadrilateral and triangular zones defined by node points taken in a counter-clockwise sequence. The zones are arranged sequentially in an ordered march through the geometry. The order can be chosen so that the minimum bandwidth is obtained. The mesh that is generated can be used as input to any two-dimensional as well as any axisymmetrical structure program. The following are limited only by a DIMENSION statement. The code currently has a maxima of 100 coordinate points defining a meridian or ray, 40 meridians, 40 layers. There are no limits on the number of zones or nodes for any problems. (ERA citation 08:025235)...Software Description: CDC7600; FORTRAN; SCOPE; 8 output and scratch files are used.

FRANTIC-NRC; Time-Dependent System Unavailability.
W. E. Vesely, and F. F. Goldberg.
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research. 1984, mag tape ANL/NESC-766 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048766 Price code: CP T09

FRANTIC-NRC was developed to investigate periodic testing schemes and operational and design modifications as they affect system unavailabilities and accident probabilities. The program calculates both the instantaneous and the average unavailability for any general system model and gives a breakdown of the unavailability contributions from failures, testing, and repair. Non-repairable components, monitored components, and periodically-tested components are considered. Accident sequences, such as those constructed from event trees, can also be evaluated for their instantaneous and average probability behavior. The name FRANTIC is an acronym for Formal Reliability Analysis including Normal Testing, Inspection and Checking. The code represents one extension of the probabilistic methodology described in WASH-1400. Testing characteristics which can be specified as input data include the test interval, test duration time, repair time or allowed downtime, the test override capability, test efficiency, and associated human-caused failure probabilities. The output consists of tables and plots of the system unavailability along with a breakdown of the unavailability contributions. Sensitivity studies can be performed. Reference report, NUREG-0193. (ERA citation 08:025236)... Software Description: IBM370; FORTRAN IV; OS/370; 140K bytes of memory are required for execution.

BEACON/MOD3; Containment System Fluid Flow.
C. R. Broadus, R. J. Doyle, S. W. James, J. F. Lime, and W. J. Mings.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-767 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048767 Price code: CP T99

The BEACON series of programs is designed to perform a best-estimate analysis of the flow of a mixture of air, water, and steam in a nuclear reactor containment system under loss-of-coolant accident conditions. The code can simulate two-component, two-phase fluid flow in complex geometries using a combination of two-dimensional, one-dimensional, and lumped-parameter representations for the various parts of the system. BEACON/MOD3 contains mass and heat transfer models for wall film and for wall conduction, and is suitable for the evaluation of short-term transients in PWR dry containment systems. The capability to examine the details of a two-component, two-phase flow field in one or two dimensions under nonhomogeneous, nonequilibrium conditions (unequal velocities, unequal temperatures between the two phases) allows analysis of such problems as the calculation of jet impact forces of a fluid leaving a pipe break, the motion of a large pressure wave across a compartment, the variation in flow properties as air is displaced from a compartment by steam and water, the water entrainment or deentrainment by a high-speed vapor flow, the flow of a flashing liquid, and many other complex nonequilibrium problems of containment system analyses. BEACON/MOD3 does not have pressure suppression containment models. The Eulerian computational equations have been modified for the variable nodalization of a mesh with the spatial dimensions of each cell stored in row-wide and column-wide arrays. Reference reports, NUREG/CR-1148, INEL-IGS Programming Guide. (ERA citation

08:023579)...Software Description: CDC CYBER176;CDC7600; FORTRAN IV (98%) and COMPASS (2%); NOS/BE CDC CYBER176), SCOPE 2.1 (CDC 7600); 120,000 (octal) words of SCM and 34,000 (octal) words of LCM for the largest of the eight sample problems. The LCM required is a function of the program size (i.e., the number of nodes or computational cells) and is dynamically allocated by the BEACON code.

BEHAVE-SST; Overpower Transient Fuel Mechanics.
D. B. Atcheson.
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept. 1984, mag tape ANL/NESC-768 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048768 Price code: CP T15

BEHAVE-SST calculates the steady-state and overpower transient behavior of cladding, fuel, and voidage in oxide LMFBR fuel rods prior to cladding failure. Cylindrical symmetry is assumed throughout the program. The BEHAVE-SST program calculates the stress, strain, displacement, and temperature fields in the fuel and cladding. Processes simulated include: cracking of fuel, dilation of fuel and cladding due to irradiation effects and thermal expansion, fuel densification by both stress and diffusion-controlled processes, axial slippage or locking at the fuel-cladding interface, axial flow of fuel, and gas pressurization of the central molten fuel region. Cladding failure is predicted utilizing a life-fraction cumulative damage technique. Reference report, GEFR-00001. (ERA citation 08:023512)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1.3; 150K of small-core memory (SCM) is required. The program is overlayed extensively.

PCTEST; Principal Component Test for Outliers.
V. E. Kane, and C. L. Begovich.
Oak Ridge Gaseous Diffusion Plant, TN. 1984, mag tape ANL/NESC-769 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048769 Price code: CP T09

PCTEST performs principal component analysis on multivariate data with emphasis on methods which can be used to detect outlier data. Programming is done in single-precision; conversion to double-precision would not be difficult. Dynamic dimensioning is used to accommodate a large variety of data sets. Reference report, K/UR-7. (ERA citation 08:025237)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 260K bytes plus array storage (total of approximately 265K bytes for 100 samples, 10 variables).

GAPCON-THERMAL3; Fuel Steady State and Transient Behavior.
D. D. Lanning, C. L. Mohr, F. E. Paniske, and K. B. Stewart.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-770 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048770 Price code: CP T13

GAPCON-THERMAL3 calculates the thermal and mechanical behavior of the fuel and cladding in a nuclear fuel rod during normal operation for both steady-state and operational transients. Modeling is axisymmetric for the thermal and mechanical calculations. The current model does not compute the strain at pellet-pellet interfaces. As many as 17 variable-length axial regions can be modeled with no limitation on the number of fuel and cladding radial nodes. References report, PNL-2434. (ERA citation 08:023554)...Software Description: CDC6600,7600,CYBER74; CDC Extended FORTRAN IV; SCOPE 3.4 (CDC6600), NOS/BE and SCOPE 2.1 (CDC7600); About 220K of addressable storage is needed for execution of a typical problem.

TRUMP; Transient and Steady State Temperature Distribution.
D. C. Elrod, and W. D. Turner.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-771 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048771 Price code: CP T14

TRUMP solves a general nonlinear parabolic partial differential equation describing flow in various kinds of potential fields, such as fields of temperature, pressure, or electricity and magnetism; simultaneously, it will solve two additional equations representing, in thermal problems, heat production by decomposition of two reactants having rate constants with a general Arrhenius temperature dependence. Steady-state and transient flow in one, two, or three dimensions are considered in geometrical configurations having simple or complex shapes and structures. Problem parameters may vary with spatial position, time, or primary dependent variables--temperature, pressure, or field strength. Initial conditions may vary with spatial position, and among the criteria that may be specified for ending a problem are upper and lower limits on the size of the primary dependent variable, upper limits on the problem time or on the number of time-steps or on the computer time, and attainment of steady state. Reference reports, UCRL-14754 Rev. 3 and UCRL-50589. (ERA citation 08:024135)...Software Description: IBM360,370;CDC7600; FORTRAN IV (95%) and BAL (5%) (IBM); FORTRAN IV (CDC); OS/360 (IBM360), OS/370 (IBM370), SCOPE 2.1.5 (CDC7600); As dimensioned, the program requires 400K bytes of storage on an IBM370 and 145,100 (octal) words on a CDC7600.

FORTIO: FORTRAN Interface to IBM370 MACROS.
L. Shalla.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-772 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048772 Price code: CP T11

The FORTIO Assembly language subroutines provide an interface between FORTRAN programs and selected IBM 360/370 Operating System (OS) Supervisor and Data Management input-output macros...Software Description: The subroutines are written in the BASIC Assembly language for implementation on an IBM 360/370 computer under OS/360, OS/370, OS/VS1, and OS/VS2 Rel. 1 operating systems. Machine requirement is less than 10K.

PRPLOT; Line Printer Plot Subroutine Package.
R. S. Walker, and J. Rumsey.
Texas Univ., Arlington. Public Transportation Center. 1984, mag tape ANL/NESC-773 U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048773 Price code: CP T12

PRPLOT is a line printer graphics subroutine package that maintains compatibility with the CalComp incremental pen plotter software. Calls to PLOT, PLOTS, FACTOR, WHERE, SYMBOL, NUMBER, SCALE, LINE, and AXIS are supported and a dummy NEWPEN subroutine is included. When a large plot size is selected, the plot is generated in page-wide strips to be separated and assembled as the complete plot. The allowable complexity of the plot is controlled by the size of a work array passed from the calling program. Symbols are generated using only vectors of 0, 90, 180, or 270 degrees, and axes are generated only at 0 or 90 degrees. Reference report, TX-11-0001. (ERA citation 08:025238)...Software Description: IBM370,360; FORTRAN IV; OS/360 (IBM360), OS/370 (IBM370); The PRPLOT subroutines required approximately 50K bytes of storage.

POLUTE; Forest Air Pollutant Uptake Model.
C. E. Murphy, Jr., T. R. Sinclair, and K. R. Knoerr.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-774 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048774 Price code: CP T03

POLUTE is a computer model designed to estimate the uptake of air pollutants by forests. The model utilizes submodels to describe atmospheric diffusion immediately above and within the canopy, and into the sink areas within or on the trees. The program implementing the model is general and can be used, with only minor changes, for any gaseous pollutant. The model provides an estimate describing the response of the vegetarian-atmosphere system to the environment as related to three types of processes: atmospheric diffusion, diffusion near and inside the absorbing plant, and the physical and chemical processes at the sink on or within the plant. Reference reports, DP-MS-76-17, DP-MS-76-28, and DP-MS-76-72. (ERA citation 08:024301)...Software Description: IBM360,370; CSMP; OS/370.

HEMP; Hydrodynamic Elasticmagneto Plastic Flow.
M. L. Wilkins, and J. A. Levatin.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-775 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048775 Price code: CP T14

The HEMP code solves the conservation equations of two-dimensional elastic-plastic flow, in plane x-y coordinates or in cylindrical symmetry around the x-axis. Provisions for calculation of fixed boundaries, free surfaces, pistons, and boundary slide planes have been included, along with other special conditions. The maximum number of J's in any K-line is 101. A problem of up to about 10,000 zones may be run. (ERA citation 08:024567)...Software Description: CDC7600; FORTRAN IV, LLL CHAT compiler; SCOPE 2.1; The HEMP main code fills the small core memory (SCM) with the code, working storage, library, and system routines. The large core memory (LCM) utilized is a function of problem size, the amount required is 527,270 (octal) words.

COMPARE/MOD1A; Transient Flow with Sinks and Doors.
R. G. Gido, G. J. E. Willcutt, Jr., J. L. Lunsford, and J. S. Gilbert.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-776 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048776 Price code: CP T12

COMPARE-MOD1 performs transient analysis of the thermodynamic conditions in zero velocity or stagnant volumes connected by flowing junctions with provision for mass and energy addition. Volume thermodynamics and junction flows are for homogeneous mixtures of: steam, two-phase water to its triple point, any three perfect gases, or combinations of the above. Vent flow can be based on the Moody equation, compressible polytropic orifice flow, and an incompressible subelement inertial relationship. Variable area doors and heat sinks can be modeled. Capabilities are incorporated to provide for accounting of loss coefficient detail, calculation of forces and moments, and plotting of results. The program was written to perform transient subcompartment analysis of nuclear power plants, including those with ice condensers. Maxima of 100 volumes, 200 junctions, 5 mass and energy addition tables (blowdown sets), 10 variable area doors, 500 heat sink nodal points, 100 force-moment surfaces, 100 junctions with detailed loss coefficient information, 10,000 points plotted, 5 curves per plot. Water temperature is restricted to the range of 273.16 to 620K. Reference report, LA-7199-MS. (ERA citation 08:023468)...Software Description: CDC7600,CYBER175; FORTRAN IV; LASL FTN operating system (similar to CDC SCOPE) (CDC7600), NOS 1.3 (CDC CYBER175); 157,000 (octal) words on a CDC7600; 153,000 (octal) words on a CDC CYBER175.

PDEONE; Solutions of Partial Differential Equations.
N. K. Madsen, and Sincovecm R.F.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-777 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048777 Price code: CP T03

PDEONE was developed as an interface to allow the software developed in the field of ordinary differential equations (ODEs) to be applied directly to the solution of partial differential equation problems. The original intent was to use PDEONE for solving coupled systems of nonlinear parabolic PDEs and this is reflected in the equations and conditions. However, the solution of other problems such as hyperbolic and elliptic PDEs may also be attempted. The equations are sufficiently general to include PDEs for which solutions may neither exist nor be unique. It is the user's responsibility to define a meaningful problem. Currently only one PDE is allowed to be defined on a given interval (a,b). This may be increased to n PDEs by increasing the dimensions of the arrays in PDEONE. (ERA citation 08:025239)...Software Description: CDC7600,6600; FORTRAN IV; SCOPE; 27,000 (octal) words of small core memory are needed to execute the sample problems.

PROSA2; Probabilistic Response Surface Studies.
J. K. Vaurio.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-778 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape.

Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048778 Price code: CP T18

PROSA2 is an implementation of the probabilistic response surface technique developed for obtaining probability distributions of the consequences of postulated nuclear reactor accidents. The problem is to find the distribution of a random variable that is a function of many other random variables when this functionality is not known in analytical form and can be obtained only numerically through parametric studies with a deterministic computer code. The program performs the following three main functions: (a) Selects values for the input parameters of a deterministic computer code from an input-specified region of interest. The regions are defined by probability distributions and confidence intervals. The program arranges the input values into combinations called "knot-points". (b) With output values ("consequences") from the deterministic code for each input-parameter combination, determines response surfaces approximating the functionality between the input and output of the deterministic code. (c) Calculates the probability distribution of the output (consequence) variable as a histogram using Monte Carlo sampling. Step (a) is omitted if the user uses his own design of knot-points. Both steps (a) and (b) can be omitted if a known analytical function is to be sampled. PROSA2 has been used mainly in conjunction with accident-analysis codes, but the methods and the programming are completely general and not limited to such applications. (ERA citation 08:023580)...Software Description: IBM370; FORTRAN IV (95%) and Assembly language (5%); OS/370; 370K bytes of storage, system input, output, and punch units are required.

IMPORTANCE; FTA Basic Event and Cut Set Ranking.
H. W. Lambert.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-779 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048779 Price code: CP T09

IMPORTANCE computes various measures of probabilistic importance of basic events and minimal cut sets to a fault tree or reliability network diagram. The minimal cut sets, the failure rates and the fault duration times (i.e., the repair times) of all basic events contained in the minimal cut sets are supplied as input data. The failure and repair distributions are assumed to be exponential. IMPORTANCE, a quantitative evaluation code, then determines the probability of the top event and computes the importance of minimal cut sets and basic events by a numerical ranking. Two measures are computed. The first describes system behavior at one point in time; the second describes sequences of failures that cause the system to fail in time. All measures are computed assuming statistical independence of basic events. In addition, system unavailability and expected number of system failures are computed by the code. (ERA citation 08:025240)...Software Description: IBM370; FORTRAN IV; OS/370; Execution of the sample problem required 140K bytes of storage.

NALAP; LMFBR Transient Response to Accident.
B. A. Martin, A. K. Agrawal, D. C. Albright, L. G. Epel, and G. Maise.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-780 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048780 Price code: CP T15

NALAP is an LMFBR system transient code. This code, adapted from the light water reactor transient code RELAP3B, simulates thermalhydraulic response of sodium-cooled fast breeder reactors when subjected to postulated accidents such as a massive pipe break as well as a variety of other upset conditions that do not disrupt the system geometry. Maxima of 40 control volumes, 50 connecting junctions, 6 thermal properties, 25 pressures, 13 liquid temperatures per pressure, 6 gas temperatures per pressure. Pressure table values must be greater than zero and less than or equal to 7000 psia. Reference report, BNL 50457. (ERA citation 08:023581)...Software Description: CDC7600, CYBER76; FORTRAN IV (99%) and COMPASS (1%); SCOPE 2.1; CDC7600 (or CYBER76) with 142,000 (octal) words of memory. In addition to card input and printer output, a FORTRAN logical unit 1 may be used for the automatic time-step option, and units under the restart option. These units may be assigned to disk or tape.

SPEKEN; Pearson, Spearman and Kendall Correlation.
N. M. Larson.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-781 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048781 Price code: CP T09

SPEKEN computes Pearson, Spearman, and Kendall correlation coefficients and associated significance levels for multivariate data. Special features of the program include exclusion of pairs of data values where one value is missing, and adjustment for tied rankings. The hypothesis of independence between each pair of variables can be tested using the obtained significance level for each correlation. Reference report, K/UR-8. (ERA citation 08:025241)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; Standard system input and printer and punch output units are required.

SLGTR; Slag Transport Models for Duct Surfaces.
L. S. H. Chow, and T. R. Johnson.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-783 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048783 Price code: CP T03

The program simulates the condition of a partly liquid slag film flowing on a cooled vertical or horizontal wall of a large duct, through which pass slag-laden combustion gases. It computes the axial variations of gas temperature, radiative and convective heat fluxes from the hot combustion gas to the cooled wall, and thickness, temperature, and velocity distributions of the slag film. The program is useful in performing design calculations for a radiant-heater concept in the downstream system of an MHD power plant. The inlet conditions and physical properties of the combustion gas and the slag film are supplied as input data by the user. The model is not valid for a soiid slag film. (ERA citation 08:023764)...Software Description: IBM360,370; FORTRAN IV; OS/370; The program requires approximately 190K bytes of memory and standard input and output units for execution.

DSNP; Dynamic Simulation Nuclear Power Plants.

D. Saphier, G. F. Popper, and T. P. Mulcahey.
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center. 1984, mag tape ANL/NESC-784 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048784 Price code: CP T16

DSNP (Dynamic Simulator for Nuclear Power-Plants) is a system of programs and data files by which a nuclear power plant, or part thereof, can be simulated. The acronym DSNP is used interchangeably for the DSNP language, the DSNP libraries, the DSNP precompiler, and the DSNP document generator. The DSNP language is a special-purpose, block-oriented digital-simulation language developed to facilitate the preparation of dynamic simulations of a large variety of nuclear power plants. It is a user-oriented language that permits the user to prepare simulation programs directly from power plant block diagrams and flow charts by recognizing the symbolic DSNP statements for the appropriate physical components and listing these statements in a logical sequence according to the flow of physical properties in the simulated power plant. Physical components of nuclear power plants are represented by functional blocks, or modules. The nuclear reactor, for example, has a kinetic module, a power distribution module, a feedback module, a thermodynamic module, a hydraulic module, and a radioactive heat decay module. Basic functional blocks such as integrators, pipes, function generators, connectors, and many auxiliary functions representing properties of materials used in nuclear power plants are also available. The DSNP precompiler analyzes the DSNP simulation program, performs the appropriate translations, inserts the requested modules from the library, links these modules together, searches necessary data files, and produces a simulation program in FORTRAN. (ERA citation 08:023539)...Software Description: IBM370; FORTRAN IV and DSNP; OS/370; 240K bytes of storage are required to compile and translate a typical power plant simulation program. Six scratch files require disk or fast magnetic tape storage and a permanent library file unit is used. All sample problems were executed in a 250K byte or smaller region.

AXICRP; Finite Element Code for Creep Analysis.
W. H. Sutherland, and J. A. Schur.
Computer Sciences Corp., Richland, WA. 1984, mag tape ANL/NESC-785 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048785 Price code: CP T11

AXICRP is a finite-element computer code for creep analysis of plane stress, plane strain, and axisymmetric bodies of revolution. Principal application has been to obtain the creep solution for a Fast Flux Test Facility (FFTF) hexagonal flow duct. Other applications to a thick-walled cylinder and a rectangular beam demonstrate the variety of structural geometries which can be analyzed. Maxima of 550 nodal points, 500 elements, 12 different materials, 8 different temperatures for which properties are given, 200 boundary pressure cards. The direct incremental treatment of time used restricts the program to the condideration of creep under constant load. Reference reports, BNWL-1142 and CSC-RL-SCI-112. (ERA citation 08:023513)...Software Description: CDC6600,7600,CYBER74; FORTRAN IV; SCOPE 3.4. Disk storage is required and use of a CalComp plotting device is optional. 142,000 (octal) words of memory are needed when the segmented load is used.

CONDYN; Polya Model Secondary Electron Spectra.
L. A. Dietz, and J. C. Sheffield.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-786 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048786 Price code: CP T03

The CONDYN program fits a Polya (negative binomial) frequency distribution to an observed secondary electron spectrum. Secondary-electron yields measured by a spectrometer are fit to the Polya statistical model by a nonlinear least squares technique. There are two basic assumptions in the Polya model: (1) the mean secondary-electron yield from each small, thin element of surface area of an ion-converter dynode follows a Poisson distribution, and (2) the frequency of these mean yields follows a gamma distribution. A maximum of 6 parameters can be fitted. (ERA citation 08:024510)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE 3.4 (CDC6600), SCOPE 2.1 (CDC7600); 16K (octal) words of memory.

ATM; Atmospheric Transport and Diffusion Model.
W. M. Culkowski, and M. R. Patterson.
National Oceanic and Atmospheric Administration, Oak Ridge, TN. Air Resources Atmospheric Turbulence and Diffusion Lab. 1984,, mag tape ANL/NESC-787 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048787 Price code: CP T11

ATM can be used to estimate the transport of a pollutant from an emitting source to some receptor point. It is based on a Gaussian plume model and is capable of calculating wet and dry deposition and air concentration of non-radioactive pollutants at various receptor points located within 50 kilometers of a source or sources. The model can treat point, area, and line sources, including wind blown sources. The use of either the Pasquill-Gifford or the Briggs-Smith dispersion parameters can be specified. Current storage allocation of the program allows maxima of 10 receptor points, 14 time periods, 10 each of point, area, and line sources, 5 pollutants. The wind rose data must have 16 directions, a maximum of 7 stabilities, and a maximum of 8 wind speeds. (ERA citation 08:024227)...Software Description: IBM360,370; FORTRAN IV (96%) and BAL (4%); OS/360,370; 210K bytes of storage are used with a unit for input and output printer and punch units.

SULCAL; Model of Sulfur Chemistry in a Plume.
C. F. Baes, W. M. Culkowski, and J. T. Holdemann.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-788 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048788 Price code: CP T09

SULCAL models the chemical reactions of sulfur species in the plume of a fossil fuel power plant, their transport through the atmosphere and deposition on the land surface. The model employs averaged concentrations based on the Gaussian plume and can calculate deposition rates for gaseous and particulate material as a function of such variables as distance from the source, wind speed, meteorological stability class, temperature, relative humidity, and the ambient con-

centrations of OH radical, ozone, and ammonia. (ERA citation 08:024228)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; 76K of memory is required along with input and output units.

ODMOD; Soil-Water Trace-Containment Transport.
N. M. Larson, and M. Reeves.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-789 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048789 Price code: CP T11

ODMOD is a transport model which predicts the coupled movement of both water and trace contaminants through a layered and unsaturated soil-moisture zone. In order to achieve computation speeds suitable for watershed implementations, moisture properties are approximated as exponential functions of pressure head, and lateral flows are treated as sinks in a basically vertical one-dimensional analysis. In addition, only advection by the Darcy-flow velocities and linear absorption by the soil-matrix are considered in depicting movement of the trace contaminant. Current storage allocation of the program allows maxima of 10 layers, 3 types of boundary conditions, 200 eigenvalues. 1000 time-steps, 21 spatial locations for output of results. (ERA citation 08:024274)...Software Description: IBM360,370; FORTRAN IV (97%) and BAL (3%); OS/360,370; Approximately 240K bytes of storage are required for execution.

NUBOW-2D Inelastic; Bowed Reactor Core Analysis.
B. K. Cha, and G. A. McLennan.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-790 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048790 Price code: CP T09

This program solves the two-dimensional mechanical equilibrium configuration of a core restraint system, which is subjected to radial temperature and flux gradients, on a time increment basis. At each time increment, the code calculates the irradiation creep and swelling strains for each duct from user-specified creep and swelling correlations. Using the calculated thermal bowing, inelastic bowing and the duct dilation, the corresponding equilibrium forces, beam deflections, total beam displacements, and structural reactivity changes are calculated. Maxima of 25 beam segments, 16 rows, 6 load points, 144 cells. All the ducts are treated as thin shell hexagons, and only the radial direction effects of creep and swelling are considered. The peak fluence increment must be less than or equal to 2.5 x 10 n/cm for the purpose of determining the time increment. (ERA citation 08:023514)...Software Description: IBM370; FORTRAN IV; OS/370; 250K bytes of storage are used. The program requires a card reader, a line printer, and two disk units for temporary storage of inelastic strain data. If the restart option is desired, another disk or tape unit is used for restart file data.

TRANSPORT; Design of Charged Particle BEAMS.
F. Rothacker.
Stanford Linear Accelerator Center, CA. 1984, mag tape ANL/NESC-791 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048791 Price code: CP T12

The first- and second-order optical properties of static-magnet charged particle beam transport systems are analyzed. The program can vary some of the physical parameters of the elements comprising the system and impose various constraints on the beam design. The effects of space charge are assumed to be negligible. (ERA citation 08:024165)...Software Description IBM370; FORTRAN IV; OS/370; 320K bytes of memory, a card input unit, and printer and punch output units are used. Numerous versions of TRANSPORT are available for other computers as well as overlayed versions for IBM computers.

EVITS; Steady State Two-Dimensional Fluid Flow.
H. M. Domanus.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-792 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048792 Price code: CP T09

EVITS was developed for estimating steady-state, incompressible, isothermal flow fields in complex two-dimensional geometries. A velocity-stream function formulation is used along with a model to resolve viscous effects at solid boundaries. A number of geometry and ten boundary type options are included to permit specification of a variety of flow situations. Maxima of 50 connected line segments to define solution domain, 40 x 40 grid for calculation. (ERA citation 08:024568)...Software Description: IBM360,370; FORTRAN IV; OS/360; 270K bytes of memory, system card input and print output units, and, optionally, disk or tape units used for storage of problem data for subsequent plotting or problem input and error messages.

CHNSED; Sediment and Containment Transport Model.
D. E. Fields.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-793 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048793 Price code: CP T12

CHNSED is an expanded model of hydrologic response of a watershed. It includes the simulation of trace contaminant transport through the watershed. Within the stream channel system trace contaminant is transported in dissolved and adsorbed form. CHNSED includes both SEDTRN, a model of sediment transport through a rectangular stream channel system, and the Wisconsin Hydrologic Transport Model, WHTM (NESC Abstract 808), a processes model. Processes considered in CHNSED include particulate mobilization (sheet erosion and overland transport) and dissolved contaminant transport (associated with run off, interflow, and base flow inputs to the channel system). An ion exchange submodel simulates the soil-contaminant-water interaction at the land surface, and sediment transport and partitioning of trace contaminant between water and sediment in the channel system are also included. Following its entry into the channel system, dissolved contaminant transport is derived from flow routing algorithms of the WHTM. Routing of the adsorbed fraction is controlled by sediment transport dynamics, which are governed by bedload and suspended load sediment transport. Current computer storage allocation allows a watershed to be divided into three segments while the channel system is

broken down into seven separate reaches. Reference report. ORNL/NSF/EATC-19. (ERA citation 08:024275)...Software Description: IBM360,370; FORTRAN IV (96%) and BAL (4%); OS/360; 350K bytes of storage are required and FORTRAN logical units 1 through 4 are utilized for temporary files during problem execution.

OPTRM; Hydrologic Transport with Optimization.
D. E. Fields.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-794 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048794 Price code: CP T12

OPTRM is utilized to determine an optimal set of model parameters for the Wisconsin Hydrologic Transport Model, WHTM (NESC Abstract 808). An optimal set of parameters is defined as that set which gives in a mathematical sense the best simulation; i.e., which provides the best match on either a monthly or daily basis between observed outflows and simulated outflows. The term outflow applies here to either water or trace contaminant values. As currently structured, OPTRM optimizes a set of either six hydrologic response parameters or three contaminant transport-related values. OPTRM determines a set of parameters for a single segment of a watershed. A segment may be considered a normally homogeneous region of the watershed. Reference report, ORNL/NSF/EATC-14. (ERA citation 08:024276)...Software Description: IBM360,370; FORTRAN IV (96%) and BAL (4%); OS/360; OPTRM utilizes an overlay structure requiring 290K bytes of storage. FORTRAN logical units 1 through 4, disk storage, are used as temporary files. The LAND and CHANL input are read from disk logical unit 5 with other input data read from unit 10. In addition to the print output on logical unit 15, units 6 and 13 are used for daily observed and simulated flow print and plot output.

SHOCK; Dynamic Response of Lumped-Mass Systems.
V. K. Gabrielson.
Sandia National Labs., Livermore, CA. 1984, mag tape ANL/NESC-795 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048795 Price code: CP T11

SHOCK calculates the dynamic response of a structure modeled as a spring-mass system having one or two degrees of freedom for each mass when subjected to specified environments. The code determines the behavior of each lumped mass (displacement, velocity, and acceleration for each degree of freedom) and the behavior of each spring or coupling (force, shear, moment, and displacement) as a function of time. Two types of models, axial, having one degree of freedom, and lateral, having two degrees of freedom at each mass can be processed. Damping can be included in all models and shock spectrums of responses can be obtained. Maxima of 100 masses, 200 springs or couplings. Complex arrangements of nonlinear options must be carefully checked by the user. (ERA citation 08:024087)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE 3.4 or NOS/BE; 125,000 (octal) words of storage are used.

HAARM3; Aerosol Behavior LOG-Normal Dist Model.
J. A. Gieseke, K. W. Lee, and L. D. Reed.
Battelle Columbus Labs., OH. 1984, mag tape ANL/NESC-797 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048797 Price code: CP T11

HAARM3, an acronym for Heterogeneous Aerosol Agglomeration Revised Model 3, is the third program in the HAARM series developed to predict the time-dependent behavior of radioactive aerosols under postulated LMFBR accident conditions. HAARM3 was developed to include mechanisms of aerosol growth and removal which had not been accounted for in the earlier models. In addition, experimental measurements obtained on sodium oxide aerosols have been incorporated in the code. As in HAARM2, containment gas temperature, pressure, and temperature gradients normal to interior surfaces are permitted to vary with time. The effects of reduced density on sodium oxide agglomerate behavior and of nonspherical shape of particles on aerosol behavior mechanisms are taken into account, and aerosol agglomeration due to turbulent air motion is considered. Also included is a capability to calculate aerosol concentration attenuation factors and to restart problems requiring long computing times. Maxima of 1000 time-steps, 42 discrete radii for the distribution calculations. Reference report, BMI-NUREG-1991. (ERA citation 08:023582)...Software Description: CDC6400,7600,CYBER73; FORTRAN IV, FTN4.5 (CDC7600); NOS/BE 1.0 (CDC CYBER73), SCOPE 2.1.3 (CDC7600); 117,000 (octal) words of storage are required.

MSF21;VTE21; Desalination Plant Optimization.
J. V. Wilson.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-798 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048798 Price code: CP T12

MSF21 and VTE21 perform design and costing calculations for multistage flash evaporator (MSF) and multieffect vertical tube evaporator (VTE) desalination plants. An optimization capability is available, if desired. The MSF plant consists of a recovery section, reject section, brine heater, and associated buildings and equipment. Operating costs and direct and indirect capital costs for plant, buildings, site, and intakes are calculated. Computations are based on the first and last stages of each section and a typical middle recovery stage. As a result, the program runs rapidly but does not give stage by stage parameters. The VTE plant consists of vertical tube effects, multistage flash preheater, condenser, and brfine heater and associated buildings and equipment. Design computations are done for each vertical tube effect, but preheater computations are based on the first and last stages and a typical middle stage. The loss of tray brine temperature is the same for each stage in the heat recovery section and in the heat reject section. The temperature and the flow rate of the heat reject stream are always greater than zero. Reference reports, ORNL-TM-3535 Parts V and VI, ORNL/TM-5230 with Errata, NESC Note, and ORNL-TM-3535 Part III (2 Microfiche). (ERA citation 08:024088)...Software Description: IBM360,370; FORTRAN (97%) and BAL (3%); OS/360,370; MSF21,VTE21 requires 272K bytes of storage for execution. Standard system card-image input and printer output units are needed.

TDIST2; Community Energy Consumption Analysis.

M. W. Golay.
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering. 1984, mag tape ANL/NESC-799 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048799 Price code: CP T11

The TDIST2 program designs and performs an analysis of community size total energy systems supplying thermal and electrical energy to a multi-consumer-type metropolitan area. The program models the time-dependent energy requirements of building unit consumers, distributes these demands within a Thermal Utility System (TUS), simulates the TUS performance and determines the required behavior of the power station and thermal-energy storage reservoir. The energy requirements of the community fall into three categories: space conditioning demands (heating and cooling), electric non-space conditioning demands (load from use of lights, motors, etc.), and hot water demands. TDIST2 can handle a maximum of 20 different building types. Piping systems used in the total energy system can have only one energy source. Reference report, FESA-RT-2047. (ERA citation 08:023872)...Software Description: IBM370,303x; FORTRAN IV, IBM FORTRAN G compiler; OS/370 MVT, Release 21.7; 250K bytes of memory, card-image input unit, and printer and card-punch output units.

LINPACK; Simultaneous Linear Algebraic Equations.
J. J. Dongarra.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-800 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048800 Price code: CP T15

LINPACK is a collection of FORTRAN subroutines which analyze and solve various classes of systems of simultaneous linear algebraic equations. The collection deals with general, banded, symmetric indefinite, symmetric positive definite, triangular, and tridiagonal square matrices, as well as with least squares problems and the QR and singular value decompositions of rectangular matrices. A subroutine-naming convention is employed in which each subroutine name consists of five letters which represent a coded specification (TXXYY) of the computation done by that subroutine. The LINPACK package also includes a set of routines to perform basic vector operations called the Basic Linear Algebra Subprograms (BLAS). There are no subroutines for general sparse matrices or for iterative methods for very large problems. Reference reports, SAND-77-0898 and ANL-80-105. (ERA citation 08:025242)...Software Description: IBM360,370 (designed to be machine-independent); FORTRAN; OS/360,370 of the IBM360,370; The entire coefficient matrix will usually be stored in the computer memory, although there are provisions for band matrices and for row-by-row processing of large rectangular matrices. 240K bytes of storage are required for execution of a typical sample problem on the IBM360,370 system.

SKILLS INVENTORY; Personnel Information System.
W. Boschear, and R. Aaron.
Holmes and Narver, Inc., Las Vegas, NV. 1984, mag tape ANL/NESC-801 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048801 Price code: CP T11

The personnel SKILLS INVENTORY system consists of the three programs SKILLS, SKLFORM, and SEARCH. Each program is run independently of the others. SKILLS is designed to add, change, and delete personal data; build, search and/or print one master record for each employee entered into the system, whether active or terminated; delete an employee's entire master record; insert indicative comments when required; and perform a general check against an employee personnel card deck to ensure compatibility of data. Using skills search parameter cards, SEARCH can perform a complex variety and combination of searches, including a reverse search, and print various listings on a selective basis. Listing information includes educational degrees, professional licenses, professional society memberships, education, and employment status. SKLFORM converts employees' coded data into readable English language and prints their entire record. Each employee's record is limited to 999 ten-character words, including comments. Each update is limited to 999 SKILLS cards. (ERA citation 08:025224)...Software Description: CDC6400,7600; FORTRAN IV; SCOPE; The number of words (octal) of small core memory (SCM) required to execute each of the three programs is: SKILLS-62,000, SKLFORM-55,000, and SEARCH-21,000.

SCHAFF; Heat and Water Transfer in Porous Media.
M. L. Sorey, and M. J. Lippmann.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-802 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048802 Price code: CP T11

The SCHAFF (Slightly Compressible Heat and Fluid Flow) program was developed for numerical modeling of liquid geothermal systems involving natural convection and hot spring discharge. For one-, two-, or three-dimensional porous media, the single-phase fluid and heat transfer equations are solved interlaced in time, using an integrated finite difference method. The mathematical model describing the physical behavior of hot-water geothermal systems is used to analyze natural or cellular convection in permeable layers heated from below. The equations used do not include source terms. With a mass source, such as a recharge or discharge well, the flow field would not necessarily equilibrate within each thermal cycle. (ERA citation 08:023362)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1; The program requires approximately 110K words of central memory for execution. Standard system input and print and punch output units are required along with units for temporary storage of two tape or disk files.

BASIC2 INTERPRETER; Minimal Basic Language.
P. R. McGoldrick, T. G. Allison, and J. Dickinson.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-803 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048803 Price code: CP T13

The BASIC2 INTERPRETER was developed to provide a high-level easy-to-use language for performing both control and computational functions in the MCS-80. The package is

supplied as two alternative implementations, hardware and software. The software implementation provides the following capabilities: entry and editing of BASIC programs, device-independent I/O, special functions to allow access from BASIC to any I/O port, formatted printing, special INPUT/OUTPUT-and-proceed statements to allow I/O without interrupting BASIC program execution, full arithmetic expressions, limited string manipulation (10 or fewer characters), shorthand forms for common BASIC keywords, immediate mode BASIC statement execution, and capability of running a BASIC program that is stored in PROM. The allowed arithmetic operations are addition, subtraction, multiplication, division, and raising a number to a positive integral power. In the second, or "hardware, implementation of BASIC2 requiring an Am9511 Arithmetic Processing Unit (APU) interfaced to the 8080 microprocessor, arithmetic operations are performed by the APU. The following additional built-in functions are available in this implementation: square root, sine, cosine, tangent, arcsine, arccosine, arctangent, exponential, logarithm base e, and logarithm base 10. MCS-80,8080-based microcomputers; 8080 Assembly language; Approximately 8K bytes of RAM to store the assembled interpreter, additional user program space, and necessary peripheral devices. The hardware implementation requires an Am9511 Arithmetic Processing Unit and an interface board. Reference report, UCID-17752. (ERA citation 08:025243)...Software Description: MCS-80; 8080 Assembly; 8K bytes of core.

CHART; Iodine Decay Heat on Charcoal Adsorbers.
R. P. Shields, and M. Siman-Tov.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-804 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048804 Price code: CP T11

CHART was developed for the thermal analysis of the charcoal adsorber in a reactor containment system; maximum temperatures caused by iodine adsorption under accident conditions are estimated. A differential equation relating the charcoal slab temperature to the heat generation rate, air flow rate, and the heat parameters of air and charcoal is solved in both one and three dimensions. Principal consideration is given very low flow rates and times soon after accident onset, the conditions which pose the greatest threat to the charcoal. CHART is limited to maxima of 1750 lattice points, 100 regions, 50 materials, 50 boundary conditions, 100 fine lattice lines along any axis, 50 gross lattice lines along any axis, 20 heat generation functions, 25 initial temperature functions, 50 position-dependent functions, 20 time-dependent functions. Reference report, ORNL-4602. (ERA citation 08:023583)...Software Description: IBM360,370,303x; FORTRAN IV; OS/360,370; CHART requires approximately 465K bytes of storage for execution and the standard input and output units.

DOPSEL; Self-Shielding in the Resonance Region.
S. Ganeson, P. B. Rao, and R. S. Singh.
Reactor Research Centre, Kalpakkam (India). 1984, mag tape ANL/NESC-805 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048805 Price code: CP T11

DOPSEL evaluates the temperature- and composition-dependent self-shielded cross-sections and self-shielding factors for neutron capture, fission, and scattering processes in both resolved and unresolved regions. The generalized resonance integrals under the NR approximation for both fissile and fertile materials and infinite dilution cross sections are also calculated. Twenty resonances on either side of the reference resonance are tested for inclusion in the overlap effect, and the following assumptions are made: the velocity of the target nucleus is small compared to the neutron velocity, the partial widths are independent of energy, and the nuclei have a Maxwellian velocity distribution. Reference report, RRC-6, and Atomkernenergie Bd. 27 reprint. (ERA citation 08:024702)...Software Description: IBM370; FORTRAN IV; OS/370 MVT; 250K bytes of memory.

2DEPEP; Elliptic, Parabolic and Eigenvalue Solutions.
E. G. Sewell.
Purdue Univ., Lafayette, IN. Dept. of Computer Science. 1984, mag tape ANL/NESC-806 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048806 Price code: CP T09

2DEPEP solves the partial differential equation system: C1(X,Y,U,V,T)*DU/DT= D(OXX)/DX+ D(OXY)/DY+ F1(X,Y,U,V,T) C2(X,Y,U,V,T)*DV/DT= D(OYX)/DX+ D(OYY)/DY+ F2(X,Y,U,V,T) in a general two-dimensional region, R, with U= FB1(S) V= FB2(S) for S on BR1, and OXX*NX+ OXY*NY= GB1(S,U,V,T) OYX*NX+ OYY*NY= GB2(S,U,V,T) for S on BR2, where BR1 and BR2 are distinct parts of the boundary. (NX,NY)= unit outward normal. U= U0(X,Y) V= V0(X,Y) for T= T0, and OXX= OXX(X,Y,DU/DX,DU/DY,DV/DX,DV/DY,T) OXY= OXY(X,Y,DU/DX,DU/DY,DV/DX,DV/DY,T) OYX= OYX(X,Y,DU/DX,DU/DY,DV/DX,DV/DY,T) OYY= OYY(X,Y,DU/DX,DU/DY,DV/DX,DV/DY,T). The Jacobian matrices of derivatives of OXX,OXY,OYX,OYY with respect to DU/DX,DU/DY,DV/DX,DV/DY and of F1,F2 with respect to U,V and of GB1,GB2 with respect to U,V must be symmetric. The related elliptic and eigenvalue problems are also solved by 2DEPEP and single equations can be handled efficiently. Examples of applications of the program are elasticity, one- or two-component diffusion, heat conduction, minimal surface, potential problems and the time-independent and time-dependent Schrodinger equations. At most two simultaneous partial differential equations can be solved. The input data set is limited to 200 cards. This can be increased by changing the value of the variable MXCARD and increasing the dimensions of the arrays L, INDX, and LNAM in the preprocessor. (ERA citation 08:025244)...Software Description: CDC6500,7600; FORTRAN IV; SCOPE; 120K (octal) words of memory are required together with an auxiliary storage device, such as disk or tape, for temporary use in large problems (unit 2), and another storage device for temporary use to store the preprocessor output.

SLACKLY; One-Dimensional Multicavity Klystron Tube Analysis.
D. Russell, and B. Tice.
Stanford Linear Accelerator Center, CA. 1984, mag tape ANL/NESC-807 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048807 Price code: CP T11

SLACKLY performs a one-dimensional analysis of a multicavity Klystron tube. Its formulation is based on the application of polarization variables to the physics of the propagation of a confined beam of electrons within a drift tube and the interaction of this beam with the cavities of the Klystron. By specifying the geometry of the Klystron and an appropriate set of initial conditions, a comprehensive analysis of the tube's characteristics will result. Space charge effects and higher-order harmonics are included in the simulation. Highly relativistic simulations may fail. (ERA citation 08:024166)...Software Description: IBM360,370; FORTRAN IV; OS/360,370; The program requires 172K bytes of memory and standard input and output units for execution.

WHTM; Wisconsin Hydrologic Transport Model.
R. J. Raridon, J. K. Munro, Jr., M. R. Patterson, D. E. Fields, and D. D. Huff.
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div. 1984, mag tape ANL/NESC-808 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048808 Price code: CP T12

WHTM is the Wisconsin Hydrologic Transport Model which treats the movement of water and trace amounts of chemicals from the place and time of introduction onto the land area segments of a watershed, through these segment vertical profiles to the water table or laterally to streams, and through the stream channel network to the watershed outfall. Overland and stream flow are governed by the Chezy-Manning equation. Trace chemical transport is represented by an ion-exchange model which uses a single distribution coefficient K(d) for each chemical species. Operation of the program requires historical hourly precipitation data and daily or monthly climatological data in addition to the parameters used to describe the watershed. Current version of the problem allows treatment of three land segments, seven reaches in the stream network, and one chemical element. The program has been used typically for 12-14 month simulations at one execution. Reference reports, ORNL-NSF-EATC-7 and ORNL/NSF/EATC-29. (ERA citation 08:024277)...Software Description: IBM360,370; FORTRAN IV (96%) and Assembler (4%); OS/360 (IBM360), OS/370 (IBM370,3033); 410K bytes of storage are required for execution.

TVENT; Ventilation System Transient Analysis.
K. H. Duerre, R. W. Andrae, and W. S. Gregory.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-809 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048809 Price code: CP T11

TVENT predicts flows and pressures in ventilation systems caused by pressure transients such as a tornado. A ventilation system model includes system elements (components such as filters, dampers, ducts, blowers) connected at nodal points to form networks. The program solves one-dimensional lumped parameter, incompressible flow equations augmented by fluid storage. The user can identify points of excessive depressurization and areas of high flow. Maxima of 500 branches, 400 nodes, 60 rooms, 40 blowers, 20 boundary nodes, 5 time functions, 20 points per time function, 15 blower functions, 20 points per blower function, 10 frames, 4 plots per frame, 50 points per plot. (ERA citation 08:024089)...Software Description: CDC7600;IBM360,370; FORTRAN IV; NOS, LTSS, and SCOPE (CDC7600), OS/360 (IBM360); 53,000 (octal) words of memory.

CREEP-PLAST2; Two-Dimensional Inelastic Structural Analysis.
J. A. Clinard.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-810R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048810 Price code: CP T13

CREEP-PLAST2 is a special-purpose two-dimensional inelastic structural analysis program based on an incremental finite-element method. It is applicable to static and quasi-static loadings of plane structures (in-plane loadings, plane-stress conditions) and axisymmetric structures (axisymmetric loadings). The loadings can consist of combinations of applied forces, pressures, displacements, and/or temperatures. Cyclic as well as monotonic loadings can be treated, and loadings can be proportional or nonproportional. The structure can be composed of up to three different materials; each should be adequately represented by the thermoelastic-plastic-creep constitutive equation forms recommended for austenitic stainless steel in U.S. DOE RDT Standard F9-5T, (September 1974). Two postprocessor graphics programs use plot output files from CREEP-PLAST2 to display the time and/or mechanical load histories of nodal displacement, stress, strain, and temperature (HISTORY-PLOT) and contour lines of whole field deformations and stress, strain or temperature (CONTOUR-PLOT). Reference reports, ORNL/TM-5868, ORNL-TM-4642, ORNL-TM-4642 Supplement 2, and Note * RECFM= VBS, BLKSIZE-3520. (ERA citation 08:024090)...Software Description: IBM360,370; FORTRAN IV (95%) and BAL (5%); OS/360,370, Level 21.6/21.7; A minimum of 230K bytes of storage is required. Storage requirements my vary up to 1500K bytes for a non-overlay solution of larger problems. The program requires approximately 410K bytes of storage to execute the sample problems. Standard input and output units are needed. In addition, the KBSAM utility routines could require up to 5 direct-access storage units for scratch storage, and as many as 5 additional sequential files on peripheral units depending on user-selected program options. The plotting programs HISTORY-PLOT and CONTOUR-PLOT each execute in less than 170K bytes of storage.

COMB; One-Dimensional High-Temperature Coal Combustor Model.
P. M. Chung, and R. S. Smith.
Illinois Univ. at Chicago Circle. Dept. of Energy Engineering. 1984, mag tape ANL/NESC-811 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048811 Price code: CP T09

COMB performs a steady-state one-dimensional analysis to predict overall behavior of a high-temperature coal combustor for use in open-cycle MHD power-generation systems. Following ignition a one-dimensional flow model with radiative heat loss is used to describe the subsequent vaporization of ash and devolatilization, combustion, and gasification of the coal. Combustion is considered to take place either at a flame sheet in the diffusion layer surrounding each particle or at the

particle surface. Redistribution of combustion products in the main gas stream of the combustor is assumed to occur according to simplified chemical equilibrium criteria, and the various competing reactions within the coal particle are resolved by use of a simplified devolatilization rate formula. Reference report, ANL/MHD-77-2. (ERA citation 08:023765)...Software Description: IBM370; PL/I; OS/370; 130K bytes of storage are needed.

DWG100RQ;DWG101RQ; Convert to or from SI Units.
J. T. Scott, and D. Branscomb.
Monsanto Research Corp., Miamisburg, OH. Mound. 1984, mag tape ANL/NESC-812 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048812 Price code: CP T11

DWG100RQ,DWG101RQ consists of five programs used to convert SI metric units of measurement from engineering drawings to U.S. customary dimensions based on the rounding rules specified in the Mound Laboratory Design/Drafting Standard DWG No. SPA760290 (DWG100RQ), or to convert U.S. customary units of measurement from engineering drawings to SI metric dimensions based on the rounding rules specified in the Mound Laboratory Design/Drafting Standard DWG No. SPA800269 (DWG101RQ). The five programs are MTRC0001, MTRC0002, MTRC0003, MTRC0004, and MTRC1001. MTRC0002 is a preprocessor used to format input data to align decimal points, generating 83-character data records that can be easily sorted. MTRC0003 and MTRC0004 sort numerical data based on the sign of the number and the sign of the exponent. MTRC0003 writes the numerical data to one of four files based on whether the number is positive or negative and whether the exponent is positive or negative. These files are then sorted by the IBM System SORT utility and merged by MTRC0004 for input either to MTRC0001, if metric units are to be converted to U.S. customary units, or to MTRC1001, if U.S. customary units are to be converted to metric units. (ERA citation 08:025245)...Software Description: IBM360,370,303x; FORTRAN IV (85%) and COBOL Version 4 (15%); OS/360; 50K bytes of memory are required to execute MTRC0002, MTRC0003, and MTRC0004. MTRC0001 and MTRC1001 require 90K bytes and the IBM SORT utility uses 70K bytes.

GLOVE CHANGE ANALYSIS SYSTEM; Glove Data Base.
J. W. Sanders.
Rockwell International, Golden, CO. Rocky Flats Plant. 1984, mag tape ANL/NESC-813 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048813 Price code: CP T11

The system uses the Glovebox Glove Data Base for analysis of the frequency, nature, and probable cause of glovebox glove failures, and for tracking and scheduling routine preventive-maintenance changes. The system provides edits of weekly data input, monthly summary of change activity and gloves scheduled to be changed, plus a maintenance-type program to annually remove old data from the active files. File retrieval language is then used to perform non-routine statistical analyses on any combination of data elements. The GLOVE CHANGE ANALYSIS SYSTEM was developed in support of an overall Glove Quality Program administered by the Rocky Flats Quality Engineering and Control organization. No controls are included on glove inventory or issues from stock, nor does the system provide validation of glove type correctness for various kinds of service. (ERA citation 08:024091)...Software Description: IBM360, COBOL with TOTAL DBMS (95%) and Assembler (5%); OS/360 HASP with CAPEX optimizer.

TRITMOD; Advection Model of Tritium Dispersion.
C. E. Murphy.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-814 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048814 Price code: CP T03

TRITMOD is a steady-state advection model of tritium dispersion and cycling in underlying vegetation and soil from an atmospheric point source. Radial geometry is assumed. Tritium is in both gaseous and water vapor form. Steady-state conditions and radial geometry are assumed. (ERA citation 08:024261)...Software Description: IBM360; CSMP; OS/370.

ALVIN; Differential-Integral Data Consistency.
D. R. Harris, W. A. Reupke, and W. B. Wilson.
Rensselaer Polytechnic Inst., Troy, NY. Dept. of Nuclear Engineering. 1984, mag tape ANL/NESC-815 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048815 Price code: CP T15

ALVIN analyzes the consistency of a set of differential and integral nuclear data, adjusts the differential nuclear data to improve agreement with integral observations, and identifies inconsistent data. ALVIN also computes required sensitivities and related quantities such as sensitivity profiles. Reference report, LA-5987. (ERA citation 08:024639)...Software Description: CDC7600; FORTRAN IV; SCOPE; 55,000 (octal) words of small core memory (SCM) and 303,000 (octal) words of large core memory (LCM) are required to execute the program.

DPOLE; Helmholtz Equation on General Three-Dimensional Region.
O. Widlund, and D. P. O'Leary.
New York Univ., NY. Courant Inst. of Mathematical Sciences. 1984, mag tape ANL/NESC-816 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048816 Price code: CP T11

DPOLE solves the Dirichlet problem for the Helmholtz equation over a general bounded three-dimensional region imbedded in a unit cube -W(XX)-W(YY)-W(ZZ)+ CC*W= G1 in the region W= F on the boundary where F and G1 are given functions of X, Y, and Z, and CC is a real constant. The boundary is arbitrary. Reference report, COO-3077-155. (ERA citation 08:025246)...Software Description: CDC6600,7600; FORTRAN IV, FTN 4.6+ 460 compiler; SCOPE 3.4.4 (CDC6600), SCOPE 2.1.3 (CDC7600); 52K (octal) words of memory are required.

COVE1; Creep Collapse for Oval Fuel Pin Tube.

C. L. Mohr.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-817 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048817 Price code: CP T11

COVE1 is a time-dependent incremental creep collapse code that estimates the change in ovality of a fuel pin cladding tube. Application is intended primarily for tubes manufactured from zircaloy. Therefore, provision is made for the effects of anisotropy in the Prandtl-Reuss flow equations for inelastic incremental deformations by using the P and R strain ratio coefficients. The creep deformation is computed in terms of the length of the collapse zone and includes the effects of changes in temperatures, system pressure, fill gas pressure, and neutron flux levels. COVE1 does not include the thermal gradient in either the stress or creep calculation. A uniform temperature through the thickness of the tube is assumed, and creep strains and thermal stress effects due to the thermal gradients are not included. Reference report, BNWL-1896. (ERA citation 08:023555)...Software Description: CDC6600; FORTRAN IV; SCOPE 3.4.2; 135K (octal) storage is required for execution.

CONTEMPT4/MOD2; Multicompartment Containment.
L. J. Metcalfe, and D. R. Meier.
EDS Nuclear, Inc., San Francisco, CA. 1984, mag tape ANL/NESC-818 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048818 Price code: CP T99

CONTEMPT4/MOD2 describes the long-term behavior of multicompartment pressurized water reactor (PWR) containment systems and experimental containment systems subjected to postulated loss-of-coolant accident (LOCA) conditions. The program calculates the time variation of compartment pressures, temperatures, mass and energy inventories, heat structure temperature distributions, and intercompartment mass and energy exchange based on user-supplied values for compartment descriptions, time-step and edit controls, and selected problem features. Analytical models available to describe containment systems include models for containment fans and pumps, cooling sprays, fan coolers, heat conducting structures, sump drain, and PWR ice condensers. Optional automatic time-step control allows the code to determine time-step sizes within limits dictated by the user. Maxima of 999 lumped parameter compartments, 999 input tables, 99 intercompartment flow junctions, 99 of most other containment features. Reference report, TREE-NUREG0-12-2. (ERA citation 08:023584)...Software Description: CDC7600; FORTRAN IV (96%) and CMPASS (4%); SCOPE 2.1; 160,000 (octal) small core memory (SCM) and 100,000 (octal) large core memory (LCM) are required for CONTEMPT4 compilation. CalComp or FR80 plotting devices are needed for graphical output.

ANOVA; Three Factor Analysis of Variance.
J. H. Carder, and G. M. Grogger.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-819 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048819 Price code: CP T09

ANOVA provides the analysis of variance techniques necessary to analyze experimental data. Four models can be used to analyze one, two, or three factor experiments, with the factors being either fixed or random. These models are: fully crossed, fully nested, factors A and C crossed with B nested in A, and factors A and B crossed with C nested in AB. Due to current program dimensions, maxima of 40 levels of factor A, 20 levels of factor B, 20 levels of factor C, and 100 repeats are allowed. Reference report, BKC Document 25. (ERA citation 08:025247)...Software Description: CDC6600; FORTRAN IV; SCOPE; 55,000 (octal) words of memory.

STESEP; Solar Total Energy System Evaluation.
B. L. McFarland.
Rockwell International, Canoga Park, CA. Energy Systems Group. 1984, mag tape ANL/NESC-821 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048821 Price code: CP T09

STESEP was developed to evaluate trade-offs related to cascading of thermal power conversion systems, determination of optimum collector sizes and operating conditions, and comparison of solar total energy concepts in various types of commercial buildings in different parts of the country. STESEP evaluates the operating Rankine cycle solar thermal total energy system and photovoltaic total energy system for commercial buildings using either a deterministic approximation of the local weather conditions or tape data from typical meteorological year (TMY) tapes developed by Sandia Laboratories, Albuquerque, from the SOLMET tapes of the National Oceanic and Atmospheric Administration's (NOAA's) National Climatic Center, Asheville, North Carolina. Only average days can be considered. Only superheated Rankine thermal cycles can be analyzed. Only sensible heat thermal storage systems can be included in the analysis. Transients due to cloud formations or startup/shutdown conditions cannot be analyzed. Variable inflation or escalation rates cannot be analyzed. Reference report, AI-78-18. (ERA citation 08:023297)...Software Description: CDC6600,7600;IBM370; FORTRAN IV; OS/370 (IBM370), SCOPE (CDC6600,7600); 94K bytes of memory (IBM370) and 31K (octal) words of memory.

SPAR1; Shielding with Analytic Ray-Tracing.
O. J. Wallace.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-823R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048823 Price code: CP T14

SPAR1 calculates exact gamma-ray fluxes from uniform sources with the shapes of slabs, disks, lines, cylinders, truncated cones, toroids, and spheres. Gamma-ray dose rates and energy absorption rates can also be obtained by including in the program input data gamma-ray buildup factors expressed in Taylor Exponential Coefficient form. Furthermore, SPAR1 will calculate fast-neutron dose rates and thermal-neutron fluxes in those cases where the use of neutron-removal cross sections is valid. In general, all three-dimensional sources having curved surfaces (cylinders, spheres, and toroids) may have both curved and slab shields intervening between the source and the detector point. Slab shields are allowed in all cases. Both slab and curved shields are assumed

to be laminar. Source self-attenuation is always included in flux calculations, and multiple energy levels may be considered. Both interior and exterior detector points are allowed for cylindrical, slab, and spherical sources, and line sources may be tilted with respect to their slab shields. The detector point associated with a cylindrical volume source may be arbitrarily located, and a finite cylindrical shield may be considered. A cylindrical surface source is also available. No more than 20 energy levels, 20 slab and 20 curved shield laminas, and one detector point can be considered in one case. Up to 250 cases can be grouped in one run. Reference reports. WAPD-TM-1196 and WAPD-TM-1197. (ERA citation 08:024719)...Software Description: CDC6600,7600; FORTRAN IV: SCOPE 3.1 (CDC6600); 50K central memory and one system disk.

UDAD; Uranium Dispersion and Dosimetry Model.
M. H. Momeni, Y. Yuan, and A. J. Zielen.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-824 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048824 Price code: CP T12

The Uranium Dispersion and Dosimetry (UDAD) program provides estimates of potential radiation exposure to individuals and to the general population in the vicinity of a uranium processing facility such as a uranium mine or mill. Only transport through the air is considered. Exposure results from inhalation, external irradiation from airborne and ground-deposited activity, and ingestion of foodstuffs. Individual dose commitments, population dose commitments, and environmental dose commitments are computed. The program was developed for application to uranium mining and milling; however, it may be applied to dispersion of any other pollutant. A maximum of 80 sources may be specified. The UDAD default is 240 receptor locations corresponding to the intersections in a grid pattern of 16 wind sectors and 15 radial destances. Any set of 0-15 distances in the range 0.1 to 99.9 km. may be selected. Reference report, NUREG/CR-0553 (ANL/ES-72). (ERA citation 08;023187)...Software Description: IBM370,303x; FORTRAN IV (94%), PL/I (4%), and Assembly language (2%). The only use of PL/I is the auxiliary plotting program, CONTOUR. The only use of Assembly language is the DATE, Gregorian calendar date routine.; OS/370; 430K bytes of memory are used.

MESA; Maximum Entropy Time Series Analysis.
B. L. Kirk, B. W. Rust, and W. Van Winkle.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-825 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048825 Price code: CP T11

The MESA program determines periodic components from input data which represent a time series. Transformations may be performed on the raw data before doing the spectral analysis. Routines are included to calculate both the Fourier spectrum and maximum entropy spectrum, the Yule-Walker estimates of the autocovariance function, the periodogram ordinates, the cumulative periodogram, the autocorrelation function resulting from the maximum entropy computations, and the final prediction error, if desired. Maxima of 5 spectra, 5 transformations, 600 data points, 599 frequencies. Reference report, ORNL-5332. (ERA citation 08:025250)...Software Description: IBM360,370; FORTRAN IV; OS/360 (IBM360), OS/370 (IBM370); 250 to 320K bytes of main memory are required with one input unit (logical unit 5) and one output unit (logical unit 6).

PHOS1; pH and Conductivity of Sodium Phosphate Solutions.
J. M. Wright, and G. E. Von Nieda.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-826R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048826 Price code: CP T03

PHOS1 calculates the pH and conductivity of sodium phosphate solutions. The equations are applicable for calculation of pH over the temperature range 0 to 300 degrees C; the equations for conductivity are valid over the temperature range of 0 to 50 degrees C. (ERA citation 08:024055)...Software Description: DEC10; BASIC; TOPS-10; Standard DEC10.

FASTCAR; Solution of Cauchy-Riemann Equations.
M. Ghil, and R. Balgovind.
New York Univ., NY. Courant Inst. of Mathematical Sciences. 1984, mag tape ANL/NESC-827 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048827 Price code: CP T09

FASTCAR (a fast Cauchy-Riemann solver) solves a second-order accurate, discrete form of the inhomogeneous Cauchy-Riemann equations on a rectangle: Ux + Vy = d(x,y), Uy - Vx = e(x,y). Any one of the following combinations of boundary conditions is possible: (a) U(x,y) and V(x,y) are periodic in x. V(x,y) is assigned on the bottom and top of the rectangle, and the sum of U(x,y) is assigned over x for some fixed y. (b) V(x,y) is assigned on the bottom, top, and right sides of the rectangle, and U(x,y) is assigned on the left side. (c) V(x,y) is assigned on the bottom and top, and U(x,y) is assigned on the left and right of the rectangle. Numerical results indicate second-order accuracy even in cases where solutions do not have the smoothness required for the appropriate theoretical estimates. The number of mesh points is dependent on the type of boundary conditions. For U(x,y) and V(x,y) periodic in x, the number of mesh points in x must be a power of 2. For the other two cases, the number of mesh points in y for V(x,y) must be a power of 2 plus 1. (ERA citation 08:025251)...Software Description: CDC6600,7600;IBM360,370; FORTRAN IV; SCOPE (CDC6600,7600), OS/370 (IBM370); 102,000 (octal) words of memory (CDC6600), 260K bytes of memory.

SWAP9; Stress-Wave Analysis in One-Dimensional Strain.
L. M. Barker, and E. G. Young.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-828 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048828 Price code: CP T11

SWAP9 is a computer program for solving stress-wave problems in one-dimensional strain. It handles both hydrostatic and elastic-plastic materials, can incorporate such effects as work hardening, changes in elastic constants, and yield strength with pressure and internal energy, and spall at a

given tensile stress. SWAP9 can also treat detonations, gases, and vaporization of solids resulting from radiant energy deposition. A maximum of 25 different materials is allowed with up to 50 constants for each material. The maximum number of lines active on the x,t plane at any given time is 300. Reference reports, SLA-74-0009 and Appendices F, G, and H from SC-DR-68-885. (ERA citation 08:024092)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE; 110,000 (octal) words of memory are required on the CDC7600.

OPTIMIZERS; Nonlinear Optimization Subroutines.
K. E. Hillstrom.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-829 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048829 Price code: CP T13

OPTIMIZERS is a collection of FORTRAN subroutines addressed to the unconstrained nonlinear optimization problem. The specific problem areas covered by the routines are - (a) unconstrained optimization, (b) nonlinear least-squares optimization, and the (c) solution of nonlinear systems of equations. No subroutines for derivative-free unconstrained optimization or for sparse nonlinear systems of equations are included. (ERA citation 08:025252)...Software Description: IBM360,370; FORTRAN IV; OS/370; 250K bytes of storage.

HAUSER5; Nuclear Reaction Cross Sections.
F. M. Mann.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-830 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048830 Price code: CP T13

HAUSER5 calculates angle-integrated and, if desired, angle-differential reaction cross sections which can include capture and fission channels. Cross sections for discrete particle channels can be calculated, as well as the total for each reaction pair. Tertiary reactions can be calculated as though the reaction occurs as two sequential binary reactions. There is no restriction on the spins of the particles. HAUSER5 can accurately predict nuclear cross sections over most energy ranges less than about 60 MeV. A maximum of six reaction pairs can be calculated. Residual nucleii can be described by 100 discrete levels and by the constant temperature level formula and/or the Fermir-gas level description. Reference report, HEDL-TME-78-83, and NESC Note 80-04. (ERA citation 08:024640)...Software Description: UNIVAC1100/44; FORTRAN V; EXEC8; Input device (logical unit 5) to read card images, output devices for printed copy (units 6, 8, 10, and 11), and output devices for punched cards (units 7 and 9). HAUSER5, when overlayed, requires 58K words of memory. The auxiliary program, TISO, requires punch units 7 and 8 and 17K words of memory.

RO75; Reverse Osmosis Desalting Plant Design.
P. Glueckstern, S. A. Reed, and J. V. Wilson.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-831 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048831 Price code: CP T11

RO75 is a program for the optimization of the design and economics of one- or two-stage seawater reverse osmosis plants. The program does not optimize or design the membrane properties and the internal structure and flow characteristics of the membrane modules; it assumes operating characteristics defined by the membrane manufacturers. Reference report, ORNL/TM-5229. (ERA citation 08:024093)...Software Description: IBM360,370,303x; FORTRAN IV (92%) and Assembly language (8%); OS/360; 150K bytes of memory are needed for execution.

SOLA-DF; Transient Two-Dimensional Two-Phase Flow.
C. W. Hirt, N. C. Romero, M. D. Torrey, and J. R. Travis.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-832 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048832 Price code: CP T09

SOLA-DF is a numerical solution algorithm for gas-liquid mixture dynamics in two space dimensions and time. The two-phase system is described by a set of mixture equations plus a relation describing the relative flow of one phase with respect to the other. The algorithm contains models to represent the interphase exchange rates of mass, momentum, and energy for water-steam mixtures. Simple equation of state, relative velocity model and phase transition model are assumed. When large phase transition rates are present, because of the decoupled calculation of phase change and the pressure iteration, care must be exercised to make sure the solution is independent of the time-step. Reference report, NUREG/CR-0690. (ERA citation 08:024136)...Software Description: CDC7600; FORTRAN IV; SCOPE and LTSS; 124,000 (octal) words of memory are required for execution.

BECKDRY; Dry Cooling for Steam-Electric Plants.
R. D. Mitchell, and J. P. Rossie.
Beck (R.W.) and Associates, Denver, CO. 1984, mag tape ANL/NESC-833 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048833 Price code: CP T12

BECKDRY designs and determines the cost of components of an indirect dry-type cooling system for a large steam-electric generating plant for a given range of design criteria. The annual performance and costs and relative bus-bar energy production costs for specified operating and economic conditions for each design are evaluated and the economically optimum design, based on minimum bus-bar costs, is determined. The program is applicable to fossil-fueled or nuclear plants equipped with mechanical-draft or natural-draft dry cooling systems utilizing direct-contact, single-pressure surface or two-zone multipressure surface condensers. A turbine generator of conventional design, such as used for evaporative-cooled plants, or a unit designed especially for high-exhaust-pressure operation may be used with the dry-cooling system. As written, BECKDRY encompasses tower sizes from 26F to 84F ITD and will simultaneously evaluate the dry-cooling system for up to three unit fuel costs and three annual fixed-charge rates. A maximum of three operating load conditions is permitted in modeling the generating unit operating profile. Reference report, ERDA-74. (ERA citation 08:023398)...Software Description: CDC6600,7600; FOR-

TRAN IV; SCOPE; 26,432 words of memory are required for execution.

MOL1D; Partial Differential Equations Solution.
J. M. Hyman, and C. M. Lee.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-834 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048834 Price code: CP T12

MOL1D is a FORTRAN subroutine package for the method-of-lines solution for systems of initial-boundary-value partial differential equations in one space dimension. This package allows a programmer with limited experience in numerical analysis to accurately solve linear and nonlinear hyperbolic equations with or without discontinuities, linear and nonlinear parabolic equations, including those arising in reaction-diffusion equations, and elliptic boundary value problems when posed as the stable time-independent solution of a parabolic equation. Systems are handled as easily as single equations, and a wide variety of boundary conditions can be accommodated. Unsymmetric differences are restricted to hyperbolic equations in characteristic form. The Fourier method may be used only in periodic problems. Reference report, LA-7595-M.(ERA citation 08:025253)...Software Description: CDC6600,7600;Amdahl470;IBM3033; FORTRAN IV; SCOPE 2.1.5 (CDC7600) and OS/MVS (IBM3033); 58K (octal) words of memory are required on the CDC7600, 105K (octal) words on the CDC6600, and 270K bytes on the IBM3033.

GEOCITY; Geothermal District Heating Economics.
H. D. Huber, C. L. McDonald, C. H. Blomster, and S. C. Schulte.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-835 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048835 Price code: CP T14

GEOCITY is a large-scale simulation model which combines both engineering and economic submodels to systematically calculate the cost of geothermal district heating systems for space heating, hot-water heating, and process heating based upon hydrothermal geothermal resources. The GEOCITY program simulates the entire production, distribution, and waste disposal process for geothermal district heating systems, but does not include the cost of radiators, convectors, or other in-house heating systems. GEOCITY calculates the cost of district heating based on the climate, population, and heat demand of the district; characteristics of the geothermal resource and distance from the distribution center; well-drilling costs; design of the distribution system; tax rates; and financial conditions. Current array dimensions provide for a maximum well-field size of 625 wells and maximum operating period of 50 years from reservoir exploration through the economic life of the district heating system. Reference report, PNL-2742. (ERA citation 08:023384)...Software Description: CDC CYBER74; (DC6600;7600); FORTRAN IV; SCOPE 3.4.2 (CYBER74). At least 54K (decimal) words of memory are required. 104,000 (octal) words of program storage were used for execution of the sample problem of a CDC7600 and 137,000 (octal) words were used on a CDC6600.

TRAC-PD2/MOD1; Best-Estimate Analysis PWR LOCA.
R. Harper.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-836 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048836 Price code: CP T99

TRAC-PD2/MOD1 performs best-estimate analyses of loss-of-coolant accidents and other transients in pressurized light water reactors. The program can also be used to model a wide range of thermal-hydraulic experiments in reduced-scale facilities. Models employed include reflood, multi-dimensional two-phase flow, nonequilibrium thermodynamics, generalized heat transfer, and reactor kinetics. Automatic steady-state and dump/restart capabilities are provided. The changes reported in TRACNEWS issues through Number 5 are incorporated in this release. (ERA citation 08:023585)...Software Description: CDC7600; FORTRAN IV (FTN 4.5 FORTRAN compiler) with selected COMPASS replacement routines; SCOPE 2.1.5; CDC7600 with approximately 62K words of small core memory (SCM) and 131K words of large core memory.

DRIFT; Cooling Tower Drift Eliminator Analysis.
M. Golay, and J. Chan.
Massachusetts Inst. of Tech., Cambridge. 1984, mag tape ANL/NESC-837 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048837 Price code: CP T11

DRIFT simulates the performance of standard industrial evaporative cooling tower drift eliminators. The droplet trajectory within eliminators as well as the capture efficiency of the eliminators are calculated. Standard eliminator geometries included are the single-layer louvre, double-layer louvre, sinus-shaped, Hi-V, and asbestos-cement. Other geometries can be evaluated if the user provides the appropriate boundary information in the relevant routines. The maximum number of nodes for the input velocity distribution is 60. Reference report, MIT-EL 77-006. (ERA citation 08:023399)...Software Description: IBM370,303x; FORTRAN IV; OS/370; 190K bytes of memory are required to execute the program; additional memory is required if plotting is desired.

—Proceedings, Symposia, Etc.—

CONF; Conference Attendee and Speaker Data File.
C. Celoni, and E. Joiner.
Sandia Labs., Livermore, CA. 1984, mag tape ANL/NESC-838 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048838 Price code: CP T09

CONF is a simple tape or disk file system designed to assist conference planners in maintaining information pertaining to attendees, speakers, and other record-keeping aspects for any conference. (ERA citation 08:025254)...Software Description: CDC6600; COBOL 4.5; SCOPE 3.4.4; 16,000 (octal) words of memory are required by the CONF-010 and CONF-030 programs, and 22,000 (octal) words of memory are used by CONF-020.

DENDRO; Hierarchical Cluster Analysis of Data.
N. M. Larson, and C. L. Begovich.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-840 U.S. Sales Only. Price includes documentation. Tapes

can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048840 Price code: CP T11

DENDRO performs hierarchical cluster analysis of experimental data with options for data normalization, metrics, and clustering criteria. A dendrogram, or tree plot, can be generated on a line printer or plotter illustrating which clusters are combined at what distance. A pairwise distance matrix is stored. This matrix requires N(N-1)/2 (where N is the number of objects) storage locations. Reference report, ORNL/SD/TM-120. (ERA citation 08:025255)...Software Description: IBM360,370; FORTRAN IV (98%) and Assembly language (2%); OS/360,370; Storage required depends on problem size; small problems with 100 to 200 objects can be executed in 260K bytes of memory.

SOLTES1; Thermal Energy Systems Simulation.
M. E. Fewell, and N. R. Grandjean.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-841 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048841 Price code: CP T11

SOLTES1 simulates the steady-state response of thermal energy systems to time-varying data such as weather and loads. Thermal energy system models of individual components and simple and complex systems can be modularly constructed from a library of routines. These routines mathematically model solar collectors, pumps, switches, thermal energy storage, thermal boilers, auxiliary boilers, heat exchangers, extraction turbines, extraction turbine/generators, condensers, regenerative heaters, air conditioners, process vapor, etc. SOLTES1 also allows user-supplied routines. A preprocessor aids the user in constructing and editing system models and automatically constructs a SOLTES1 program using only those routines in the system model. Because of its modularity and flexibility, SOLTES1 can be used to simulate a wide variety of thermal energy systems such as solar power/total energy, fossil-fired power plants/total energy, nuclear-fired power plants/total energy, solar energy heating and cooling, geothermal energy, and solar hot water. Reference report, SAND-78-1315 (Revised). (ERA citation 08:023663)...Software Description: CDC6600,7600; FORTRAN IV (99%) and COMPASS (1%); NOS/BE 1.3, SCOPE 2.1, SCOPE 3.3/NOS1.2 and SCOPE 3.4/INTERCOM4.5; Usually SOLTES1 central memory requirements are between 70K and 150K (octal) words. 150 words/component in the system model of Extended Core Storage (ECS) are needed, along with 4 to 6 disk and/or tape units. PRESOL, the SOLTES1 preprocessor program, requires approximately 52K (octal) words of central memory to load under NOS/BE 1.3 on the CDC6600. SOLTES1 requires approximately 115K (octal) words to execute sample problem 1 and 142K (octal) words for sample problem 2. Approximately 10K (octal) words of ECS are required for data storage for sample problem 2 on the CDC6600. On the CDC7600 under SCOPE 2.1, PRESOL requires approximately 20K (octal) words to load, and approximately 106K and 134K (octal) words to execute sample problem 1 and 2, respectively.

SUPAN; Analysis of Beam-Type Piping Supports.
M. E. Nitzel.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-842 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048842 Price code: CP T09

Piping supports of many types and sizes are necessary to ensure the structural integrity of power plant piping systems. For situations where standard vendor items may not be adequate or economical, beam-type piping supports are often useful. Such supports may be fabricated from bar stock, I-sections, pipes, or beams of other cross sectional geometries. The SUPAN program was developed to facilitate ASME code analysis of a large number of supports subjected to multiple loading conditions. Allowable member cross section types are--solid rectangular, American Institute of Steel construction W, M, S, and HP shapes, solid round, solid square, and pipe. A maximum of 25 separate load cases may be specified. Five of these may then be combined to form each of the combined load sets used in the analysis. Alternate signs of response spectrum load sets are considered and service condition stress limit multiplication factors are determined when the combined load sets are formed. Maxima of 100 supports, 10 material property sets, 20 cross sectional geometry sets, 25 separate load cases, 25 combined load sets. Reference report, RE-A-79-051. (ERA citation 08:023400)...Software Description: CDC7600; FORTRAN IV; SCOPE 2; 15,000 (octal) words of small core memory (SCM) and 372,000 (octal) words of large core memory (LCM) are used.

RANDOM NUMBERS; Obtained from U235 alpha Decay.
N. A. Frigerio, L. P. Sanathanan, M. Morley, N. A. Clark, and J. Wang.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-843 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048843 Price code: CP T99

RANDOM NUMBERS is a data collection of almost 2.7 million 31-bit random numbers generated by using a high resolution gas ionization detector chamber in conjunction with a 4096-channel multichannel analyzer to record the radioactive decay of alpha particles from a U-235 source. The signals from the decaying alpha particles were fed to the 4096-channel analyzer, and for each channel the frequency of signals registered in a 20,000-microsecond interval was recorded. The parity bits of these frequency counts, 0 for an even count and 1 for an odd count, were then assembled in sequence to form 31-bit random numbers and transcribed onto magnetic tape. This cycle was repeated to obtain the random numbers. The RANDOM NUMBERS tape contains 2,669,568 31-bit numbers. (ERA citation 08:025256)...Software Description: IBM370,303x; Binary (random numbers) and FORTRAN IV (AFRAND and Driver); OS/370; The auxiliary program AFRAND requires 55K bytes of memory for execution with the test case provided. Random numbers from the tape are read from tape unit 13.

FUELS DATA; Model Verification Fuel Rod Data.
E. T. Laats, N. L. Hampton, N. R. Scofield, and D. R. Coleman.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-844 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048844 Price code: CP T18

FUELS DATA is a collection of machine-readable fuel behavior data from domestic and foreign water reactor test facilities developed for use in model verification of the Nuclear Regulatory Commission FRAP codes. Maxima of 70 operating steps, 5 axial powder distribution profiles, 3 measurement locations. Reference reports, EGG-CAAP-5114 and EGG-CAAD-5486. (ERA citation 08:023446)...Software Description: CDC CYBER176,175; CDC7600; FORTRAN IV for the auxiliary edit program, data are recorded as EBCDIC characters; NOS/BE 1.4 (CDC CYBER176), NOS 1.3 (CDC CYBER175), SCOPE 2.1 (CDC7600); 36,000 (octal) words of memory are used by the auxiliary editing program.

COMRC1; Slag Transport Models for MHD Systems.
L. S. H. Chow, and T. R. Johnson.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-845 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048845 Price code: CP T09

In a coal-fired, open-cycle MHD system, all downstream component surfaces that are exposed to combustion gases will be covered by a solid, liquid, or solid-liquid film of slag in which some of the potassium seed is dissolved. The specific nature of the film will depend on the physical and optical properties of the slag and seed and on local thermal conditions. The COMRC1 program simulates the condition of a partly-liquid film flowing downward on a cooled vertical, opaque wall. The dominant mode of heat transfer to the film surface is the radiant heat flux from the slag-laden combustion gas. Either an opaque or a semitransparent slag film can be treated. The axial variations of gas temperature to the cooled wall and thickness, temperature, and velocity distributions across the slag film are computed. The program is useful in performing design calculations or parametric studies for a radiant-heater concept in the downstairs system of an MHD power plant. Maxima of 50 increments along the axis of the vessel, 40 increments across the slag film. The program is not valid for a solid slag film. (ERA citation 08:023766)...Software Description: IBM360,370,303x; FORTRAN IV; OS/370; Approximately 250K bytes of memory and standard input and printer output units are required for execution.

PROMSYS; Programmed Equipment Maintenance.
D. L. Morgan, and B. E. Srite.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-846 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048846 Price code: CP T12

PROMSYS is a computer system designed to automate the scheduling of routine maintenance and inspection of plant equipment. This 'programmed maintenance' provides the detailed planning and accomplishment of lubrication, inspection, and similar repetitive maintenance activities which can be scheduled at specified predetermined intervals throughout the year. The equipment items included are the typical pumps, blowers, motors, compressors, automotive equipment, refrigeration units, filtering systems, machine shop equipment, cranes, elevators, motor-generator sets, and electrical switchgear found throughout industry, as well as cell ventilation, shielding, containment, and material handling equipment unique to nuclear research and development facilities. Four related programs are used to produce sorted schedule lists, delinquent work lists, and optional master lists. Five additional programs are used to create and maintain records of all scheduled and unscheduled maintenance history. (ERA citation 08:024094)...Software Description: IBM370; ANS COBOL (97%) and Assembly language (3%); OS/360; 200K bytes of memory are required for execution.

DISPL1; One- and Two-Dimensional Kinetics-Diffusion Partial Differential Equations Solution.
G. K. Leaf, and M. Minkoff.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-847 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048847 Price code: CP T14

DISPL1 is a software package for solving second-order nonlinear systems of partial differential equations including parabolic, elliptic, hyperbolic, and some mixed types. The package is designed primarily for chemical kinetics-diffusion problems, although not limited to these problems. Fairly general nonlinear boundary conditions are allowed as well as interface conditions for problems in an inhomogeneous medium. The spatial domain is one- or two-dimensional with rectangular Cartesian, cylindrical, or spherical (inone dimension only) geometry. Reference report, ANL-77-12 Rev. 1 (ERA citation 08:024569)...Software Description: IBM370/195,303x;CDC7600,6600,CYBER175; MORTRAN2 (80%) and FORTRAN (20%). By use of the MORTRAN2 preprocessor %F control card, the FORTRAN component is passed through the MORTRAN2 preprocessor along with the MORTRAN component; OS/370 (IBM370/195,3033), SCOPE 2.1.3 (CDC7600), SCOPE 3.4.4 (CDC6600), NOS1.3 (CDC CYBER175); The IBM version DISPL1 source requires 600K bytes of storage for compilation. Compilation and execution of the DISPL1 sample problems, including the plot creation jobs, requires a maximum of 350K bytes. The CDC version requires a maximum of 121,000 (octal) words of executable storage for the CDC7600, 140,000 (octal) words for the CDC6600, and 135,000 (octal) words for the CYBER175 execution. In the MORTRAN2 preprocessing stage, the user can easily adjust the storage requirements to the optimum for a current problem. In addition to the standard input and print files, the program requires files assigned to logical unit 10 for reading restart data, logical unit 11 for writing data for a later restart, and logical unit 12 for writing plotting data.

SYSREL; Reliability Analysis of Series Systems.
C. J. Biver.
General Electric Co., St. Petersburg, FL. Neutron Devices Dept. 1984, mag tape ANL/NESC-848 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048848 Price code: CP T03

The SYSREL program uses a Monte Carlo simulation procedure to derive estimates of the reliability of systems consisting of a series of stages, each of which may be composed of components of equal or unequal reliability values operating in active, partial, or standby redundancy modes. In all cases a constant failure rate (exponential distribution of component life) is assumed. However, the addition of other descriptions

of component life, such as gamma, log-normal, etc. would be relatively simple. Maxima of 10 stages, 5 components per stage SYSREL is only applicable to series systems. However, the method outlined may be extended to series-parallel systems, although not with little effort. Reference report, GEPP-TIS-411. (ERA citation 08:025257)...Software Description: Honeywell Series 60 Level 66,000; BASIC; GCOS.

PORTABLE LISP; A List-Processing Interpreter.
W. P. Taylor, and L. A. Cox, Jr.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-849 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048849 Price code: CP T09

The program constitutes a complete, basic LISP (LIST-Processing language) interpreter. LISP expressions are evaluated one by one with both the input expression and the resulting evaluated expression printed. Expressions are evaluated until a FIN card is encountered. Between expression evaluations a garbage-collection algorithm is invoked to recover list space used in the previous evaluation. The main restriction is the amount of list space used by the program. By changing the statement CONST MAXNODE = 600 to CONST MAXNODE = 2000 a much larger expression can be evaluated. A major feature of LISP, the ability to define and retain function definitions, is not implemented. This is a necessary extension for a useful LISP system. (ERA citation 08:022844)...Software Description: CDC7600; PASCAL; SCOPE; The sample problem was executed in 7000 (octal) words of memory on a CDC7600.

PASOLE; Simulation of Passive Solar Systems.
R. D. McFarland.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-850 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048850 Price code: CP T11

PASOLE is a general simulation program for analyzing thermal performance of passive-solar heated buildings. Modeling is done using a general thermal network method that allows for heat sources and thermal storage. PASOLE can also be used to simulate hybrid or active solar heating systems. The user describes the thermal network model by specifying nodes that represent finite regions, connections between these nodes, and parameters associated with the nodes and connections. Sun position equations are used with a global-to-direct solar radiation correlation to develop solar heat sources from measured insolation data. The program includes built-in models of water-wall and masonry-wall versions of south-mass-wall type passive systems. Maxima of 50 nodes 100 connections 1 control node. Phase change storage is treated by use of temperature-dependent heat capacity. It is not convenient to handle heat-of-fusion as an isothermal enthalpy change. Internal reflections are not taken into account. For simulations in the southern hemisphere, changes to the solar angle and time equations are required. There are no restrictions on on initial temperature conditions, but a small heat balance error will be observed if the initial temperatures are not in equilibrium. (ERA citation 08:020080)...Software Description: CDC6600,7600; IBM360,370,3033; FORTRAN IV; NOS SCOPE (CDC6600), LTSS SCOPE(CDC7600), and OS/360(IBM360); PASOLE requires 110,000 (octal) words of program storage on a CDC6600, 60,000 (octal) words of program storage on a CDC7600, and 150K bytes of memory on an IBM3033.

MINX; Multigroup Cross Sections from ENDF/B-IV Data.
P. D. Soran, R. E. MacFarlane, D. P. Harris, R. J. LaBauve, and J. S. Hendricks.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-851 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048851 Price code: CP T17

MINX calculates fine-group averaged infinitely-dilute cross sections and self-shielding factors from ENDF/B-IV (reference 2) data. Its primary purpose is to generate a pseudo-composition independent multigroup library for input to the SPHINX (reference 3) space-energy collapse program using CCCC-III (reference 4) standard interfaces. MINX incorporates and improves upon the resonance capabilities of existing codes such as ETOX (reference 5) and ENDRUN (reference 6) and the high-order group-to-group transfer matrices of SUPERTOG (reference 7) and ETOG (reference 8). Fine-group energy boundaries, Legendre expansion order, gross spectral shape component in the Bondarenko (reference 9) flux model, temperatures, and dilutions can all be user-specified. The principal restriction is the computing time available for a given desired accuracy. Because of the need to partition the very large energy versus cross section tabulations in the point-wise library, extensive use is made of the BCD form of the ENDF data. For large problems requiring high accuracy, use of the BCD ENDF format can lead to excessive I/O transfers. (ERA citation 08:022507)...Software Description: CDC7600;IBM370; FORTRAN IV (H compiler), and BAL (IBM370), FORTRAN IV (RUN or FTN compiler) and COMPASS (CDC7600); OS/370 (IBM370), SCOPE (CDC7600); Storage requirements depend on characteristics of the problem. The 50-group library problem with overlay on the IBM370 requires approximately 330K bytes of memory. NESC tested this problem without overlay using 610K bytes on an IBM370/195. NESC execution of the CDC7600 sample problem required about 127,000 (octal) words of storage.

HEXEREI2; HTGR Thermal-Hydraulic Analysis.
G. E. Giles, W. D. Turner, K. W. Childs, R. M. DeVault, and B. R. Backer.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-852 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048852 Price code: CP T15

HEXEREI2 is a complex program capable of analyzing High Temperature Gas-Cooled Reactors (HTGRs) during accidents to provide most of the information needed for HTGR safety studies. HEXEREI2 is designed to solve steady-state and transient three-dimensional heat conduction, coupled with convection to axially flowing coolant in a large number of parallel channels. Both the coolant temperature and flow distribution among the channels are influenced by the heat transferred into the coolant. The thermal conductivity, density, and specific heat may be spatial- and temperature-dependent and may be modified further by HTGR design parameters. The conductivity can be anisotropic. Heat generation rates may be dependent on time, position, and HTGR design parameters. The boundary temperatures may be time-dependent. The

boundary conditions may be fixed temperatures or any combination of prescribed heat flux, forced convection, and radiation from a surface to a boundary temperature. The boundary condition parameters may be time- and temperature-dependent. HEXEREI2 can model a coolant which may be helium, air, or a helium-air mixture. The nodal mesh is automatically generated from input parameters and produces a model capable of an accurate thermal-hydraulic analysis of an HTGR. The generated mesh emulates the HTGR in geometric structure allowing the code to analyze the largest HTGR design yet proposed. The major restrictions on the general application of the code are that only cylindrical geometry is allowed, and the coolant is assumed to be helium or a helium-air mixture. Problem size maxima include - 50 boundary conditions 100 fine lattice lines along any axis 50 gross lattice lines along any axis 20 heat generation functions 25 initial temperature functions 50 materials 100 regions 20 nodes in special temperature table 121 nodal columns 25 nodal planes when using coolant calculations 25 analytical functions 25 tabular functions 25 points per tabular function 100 printout times. (ERA citation 08:020667)...Software Description: IBM360; FORTRAN IV (99%) and BAL (1%); OS/360; The maximum number of nodes can be easily adjusted to fit the problem and computer storage limitations. The storage requirement on an IBM360 machine ranges from 314K bytes for one node to 1500K bytes for 6000 nodes. The sample problems required 490K bytes on an IBM370/195.

SURGTANK; Reactor Steam Surge Tank Dynamics.
D. J. Gorman, and R. K. Gupta.
Ottawa Univ., Ontario (Canada). Dept. of Mechanical Engineering. 1984, mag tape ANL/NESC-853 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048853 Price code: CP T11

SURGTANK generates the steam pressure, saturation temperature, and ambient temperature history for a nuclear reactor steam surge tank (pressurizer) in a state of thermodynamic equilibrium subjected to a liquid insurge described by a specified time history of liquid levels. It is capable also of providing the pressure and saturation temperature history, starting from thermodynamic equilibrium conditions, for the same tank subjected to an outsurge described by a time history of liquid levels. Both operations are available for light- or heavy-water nuclear reactor systems. The tank is assumed to have perfect thermal insulation on its outer wall surfaces. The program was developed for predicting pressure behavior in vertical axis cylindrical tanks with spherical dome caps. It could be readily adapted to other geometries, such as spherical tanks (re ference 2). Back-to-back insurges and outsurges cannot be treated since each must start from equilibrium conditions. The analysis does not include the effects of heaters, sprays, and safety valves. Possible modifications to include effects of sprays are discussed in reference 5. (ERA citation 08:020572)...Software Description: IBM360,370; FORTRAN IV; OS/360 (IBM360); OS/370 (IBM370); 110K bytes of storage for the insurge problem and 92K bytes of storage for the outsurge problem.

TDIST3; Community Energy Consumption Analysis.
D. B. Ebeling-Koning, and M. W. Golay.
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering. 1984, mag tape ANL/NESC-854 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048854 Price code: CP T11

The TDIST3 program performs an analysis of large integrated community total energy systems (TES) supplying thermal and electrical energy from one or more power stations. The program models the time-dependent energy demands of a group of representative building types, distributes the thermal demands within a thermal utility system (TUS), simulates the dynamic response of a group of power stations in meeting the TUS demands, and designs an optimal base-loaded (electrically) power plant and thermal energy storage reservoir combination. The capital cost of the TES is evaluated, also. The program was developed primarily to analyze thermal utility systems supplied with high temperature water (HTW) from more than one power plant. The TUS consists of a transmission loop and secondary loops with a heat exchanger linking each secondary loop to the transmission loop. The power stations electrical output supplies all community buildings and the HTW supplies the thermal demand of the buildings connected through the TUS, a piping network. Basic components of the TES model are one or more power stations connected to the transmission loop. These may be dual-purpose, producing electricity and HTW, or just heating plants producing HTW. A thermal storage reservoir is located at one power station. The secondary loops may have heating plants connected to them. The transmission loop delivers HTW to local districts; the secondary loops deliver the energy to the individual buildings in a district. Maxima of 20 different building types 10 energy sources in the piping network 75 energy consumer groups. The piping network is restricted to parallel, countercurrent flow supply, and equal diameter pipes. (ERA citation 08:020963)...Software Description: IBM 370; FORTRAN IV (G-level compiler); OS/370 MVT, Release 21.7; 280K bytes of memory, card-image input and printer output units.

REFCO8; Discounted Cash Flow Fuel Cycle Cost.
R. Salmon.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-855 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048855 Price code: CP T15

REFCO8 is designed to calculate nuclear fuel cycle cost by the discounted cash flow method for any given capital structure and interest rates. REFCO uses continuous discounting so that each expenditure or income is discounted from the time of occurrence, and fuel cycle costs are calculated for each batch of fuel both individually and cumulatively through each batch. Tax deductible fuel expense can be calculated on a batchwise basis in keeping with industry practice. REFCO8 also has provision for parametic studies of the effect of price escalation, and can be used to calculate the equilibrium fuel cycle cost of a reactor by supplying input data for a single equilibrium batch. (ERA citation 08:020476)...Software Description: IBM360,370; FORTRAN IV; OS/360 (IBM360), OS/370 (IBM370). The program requires approximately 155K bytes of memory for execution.

ANSDDF; ANSI Data Description File Utilities.
A. A. Brooks, F. D. Hammerling, and B. N. McNeely.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-856 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch

tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048856 Price code: CP T11

ANSDDF is an implementation of Level 1 of the draft proposed American National Standard Specification for an Information Interchange Data Description File. Level 1 is concerned only with unstructured alphanumeric data. The implementation, designed to provide the interface of the standard interchange format with the user system, is in the form of a user-callable multiple entry PL/I subprogram that performs the functions necessary for the creation and processing of the standard files. The implementation is for magnetic tape and the labels and block structures used are those defined for the spanned record option in ANSI X3.27-1977, Magnetic Tape Labels and File Structure for Information Interchange. (ERA citation 08:022890)...Software Description: IBM360,370,303x; PL/I; OS/360; 160K bytes of memory are needed for execution of both the ANSBLD and ANSLST procedures.

TIDY3;TIDY4; Utility to Edit FORTRAN Source Programs.
J. Jackson, and J. N. Diven.
BCS Richland, Inc., WA. 1984, mag tape ANL/NESC-857 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048857 Price code: CP T12

TIDY is a utility program for processing FORTRAN source programs into a standard form which is easy to read and modify. In processing FORTRAN software it renumbers statement labels so that they appear in increasing order, removes statement labels from unreferenced statements and deletes unreferenced FORMAT and CONTINUE statements, indents DO loops and IF levels (IF level by TIDY4 only), and collects and groups TYPE, DATA, and EQUIVALENCE statements (TIDY3 collects only TYPE statements). Each group is alphabetized and rewritten in a column-aligned manner. FORMAT statements are, optionally, either inserted following the first reference or optionally collected at the end of the code. Blanks are inserted and removed to improve readability. Maxima of 50 different tabular, non-executable statements (TIDY4) 20 characters in a single array name including DIMENSION specifications (TIDY4) 500 distinct statement labels excluding FORMAT statements (TIDY3) 250 distinct FORMAT statement labels (TIDY3) 20 nested DO loops (TIDY3) 19 TYPE statements (TIDY3). (ERA citation 08:022845)...Software Description: CDC CYBER74,175;UNIVAC1100; FORTRAN IV (TIDY3), FORTRAN ASCII (98%), Meta-Assembler (1%), and Assembler (1%) (TIDY4); SCOPE 3.4 (CDC CYBER74), NOS 1.3 (CDC CYBER175), EX1C8 (UNIVAC1100); Four mass-storage units are used for storage, 30K words of memory are required for TIDY4 execution. TIDY3 requires 46,000 (octal) words of memory.

APACHE; Two-Dimensional Chemically Reactive Fluid Flow Code.
J. D. Ramshaw, and J. K. Dukowicz.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-858 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048858 Price code: CP T13

APACHE is a time-marching finite-difference code developed to solve the equations of transient viscous multicomponent chemically reactive fluid dynamics in two space dimensions. A steady-state solution is obtained as the asymptotic limit of a transient calculation. The fluid is assumed to be an ideal-gas mixture with temperature-independent specific heats. Chemical reactions are assumed to be elementary. Current dimensioning in the program allows only one rotational and vibration level of the lasing species to be considered and a maxima of 1 chemical reaction 10 chemical species 32 cells in the horizontal direction 22 cells in the vertical direction. These restrictions may be increased by increasing the values of the appropriate parameter variables and the corresponding DIMENSION statements. (ERA citation 08:021415)...Software Description: CDC7600; FORTRAN IV; SCOPE; APACHE requires 33,000 (octal) words of small core memory and 56,000 (octal) words of large core memory.

SOLA-LOOP; Two-Phase Flow Network Analysis.
C. W. Hirt, T. A. Oliphant, W. C. Rivard, N. C. Romero, and M. D. Torray.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-859 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048859 Price code: CP T11

SOLA-LOOP is designed for the solution of transient two-phase flow in networks composed of one-dimensional components. The fluid dynamics is described by a nonequilibrium, drift-flux formulation of the fluid conservation laws. Although developed for nuclear reactor safety analysis, SOLA-LOOP may be used as the basis for other types of special-purpose network codes. The program can accommodate almost any set of constitutive relations, property tables, or other special features required for different applications. Conservation of momentum is not required by the finite difference approximations used for the momentum equation. Current dimensioning in the SOLA-LOOP program allows maxima of 10 components 8 segments per component 200 junctions 6 time levels, pressure groups, and vapor production rates per cell 5 boundary data sets. These restrictions may be adjusted by changing the values of the variables NP, NS, NJ, NK, and NM, respectively, and all appropriate DIMENSION statements. (ERA citation 08:021416)...Software Description: CDC7600,6600; FORTRAN IV; SCOPE; 34,000 (octal) words of memory are needed to execute the program.

PDFPLOT; Statistical Distribution Functions.
C. F. Miller, A. J. Nelson, N. D. Cox, and C. L. Atwood.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-860 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048860 Price code: CP T12

PDFPLOT produces plots of different types of estimated probability density functions and cumulative distribution functions. Optional output includes a listing of the cumulative probabilities. (ERA citation 08:022846)...Software Description: CDC CYBER76;CDC7600; FORTRAN IV (88%) and COMPASS (12%); SCOPE 2.1; 45,000 (octal) words of memory are needed to execute the program.

FESH; X-Y Multi-Group Neutron Transport Method.

R. N. Blomquist, and E. E. Lewis.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-861 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048861 Price code: CP T11

FESH solves the spherical harmonics approximation to the second-order multigroup neutron transport equation in two dimensions. A three-dimensional spherical harmonics approximation of user-specified order is applied to the angular variable and two-dimensional spatial finite elements to the spatial variable. Scattering is assumed to be isotropic. Either multiplication eigenvalue problems or subcritical inhomogeneous source problems can be solved with several combinations of vacuum and reflective boundary conditions possible. Sources and scattering are assumed to be is otropic; up-scattering is not allowed. Flexible dimensioning permits combinations of problem parameters to occupy an array of 50,000 words. Most group-dependent data is stored in extended core storage (ECS). (ERA citation 08:022508)...Software Description: CDC6600,7600; FORTRAN IV (MNF, University of Minnesota FORTRAN); SCOPE; 200,000 (octal) words of central memory and 142,000 (octal) words of ECS are needed to execute the program. Central memory requirements for single precision arithmetic may be estimated as (45M+ 10) * (L(L+ 1)/2)**2 + NSP*((L(L+ 1)/2)+ 2) words, where M is the number of material regions, L is the order of the spherical harmonics approximation, and NSP is the number of spatial mesh points.

FX2-TH; Two-Dimensional Time-Dependent Reactor Kinetics.
R. A. Shober, T. A. Daly, and D. R. Ferguson.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-862 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048862 Price code: CP T18

FX2-TH solves the steady-state and time-dependent two-dimensional multigroup neutron diffusion equations with thermal and hydraulic feedback. The following geometry options are available: x, r, x-y, r-z, theta-r, and triangular. FX2-TH contains two basic thermal and hydraulic models: a simple adiabatic fuel temperature calculation and a more detailed model consisting of an explicit representation of fuel pin, gap, clad, and coolant. FX2-TH allows feedback effects from both fuel temperature (Doppler) and coolant temperature (density) changes. The code is designed for nuclear reactor transient analysis. Variable dimensioning is used throughout the program so that computer storage requirements depend on a variety of problem parameters. The amount of memory required can range from 300K bytes for a small problem up to the maximum limit of computer storage for very large problems. (ERA citation 08:022509)...Software Description: IBM370,303X; FORTRAN IV (99%) and Assembly language (1%); OS/370; FX2-TH will dynamically allocate problem variables either on disk or in computer memory depending on the total amount of computer memory available. For any problem, a certain minimum amount of memory is required; this amount is dependent on the size of the problem. In general, FX2-TH operates more efficiently if sufficient computer memory is available to retain most of the problem variables permanently. The sample problem executed by NESC required 900K bytes of memory.

WHIP1; Structural Deflection Due to Blowdown.
J. H. Murphy.
Bettis Atomic Power Lab., West Mifflin, PA. 1984, mag tape ANL/NESC-863R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048863 Price code: CP T03

WHIP1 calculates the dynamic behavior of a pipe or membrane under the influences of an externally applied force, taking into account the elastic-plastic properties and the inertia of the member. WHIP1 prints the values of important variables at each time-step and graphs of these variables as output. The program was written to compute pipe deflection, or 'pipe whip' due to rupture and the ensuing blowdown process. Maxima of 200 time-steps 50 input cards 20 alternate force and time pairs. Minima of 14 input cards 2 alternate force and time pairs. (ERA citation 08:021330)...Software Description: CDC6600,7600; FORTRAN IV; SCOPE; 25,000 (octal) words of memory for the CDC6600 or 11,000 (octal) words of memory for the CDC7600.

UPD; Source Deck Maintenance Utility Routine.
G. W. Perry, and T. W. Medlin.
Tennessee Valley Authority, Chattanooga. 1984, mag tape ANL/NESC-864 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048864 Price code: CP T13

UPD is a source card maintenance program which enables the user to make many changes to an existing source deck stored on tape or disk while keeping a simple, accurate record of those changes, which include inserting, deleting, or replacing cards in the existing source deck. UPD can handle any kind of 80-column source cards provided columns 73-80 are available for use as a sequence field. A deck is defined as a series of cards that have the same four characters in columns 73-76, while a sequence number occupies columns 77-80 of each source card within the deck. Typically, there is one deck for each subprogram, and the deck name is either the subprogram name or a derivative of it. Blanks may appear in the deck name only on the right, and only digits are allowed in columns 77-80. UPD, however, can also operate on source decks that do not have any sequence numbers in columns 77-80. (ERA citation 08:022847)...Software Description: IBM360,370,303x;Amdahl470; FORTRAN IV (64%) and BAL (36%); OS/360; 150K bytes of memory, standard input and output units (logical units 5 and 6) and direct access units for the old master file (logical unit 4), the auxiliary file (logical unit 7), the new master file (logical unit 8), and a temporary file (logical unit 99) as required for execution.

PELE-IC; Fluid-Structure Interaction Analysis.
W. H. McMaster, and E. Y. Gong.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-865 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048865 Price code: CP T15

PELE-IC is a two-dimensional semi-implicit Eulerian hydrodynamics program for the solution of incompressible flow coupled to flexible structures. The code was developed to calculate fluid-structure interactions and bubble dynamics of a pres-

sure-suppression system following a loss-of-coolant accident (LOCA). The fluid, structure, and coupling algorithms have been verified by calculation of benchmark problems and air and steam blowdown experiments. The code is written for both plane and cylindrical coordinates. The coupling algorithm is general enough to handle a wide variety of structural shapes. The concepts of void fractions and interface orientation are used to track the movement of free surfaces, allowing great versatility in following fluid-gas interfaces both for bubble definition and water surface motion without the use of marker particles. (ERA citation 08:021417)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1, LTSS; 123,000 (octal) words of SCM and 272,000 (octal) words of LCM are used.

INTEROP; Nonlinear Optimization Algorithms.
D. M. Rasmuson, and R. L. Thurgood.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-866 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048866 Price code: CP T12

The INTERactive OPtimization system (INTEROP) is a collection of search direction algorithms for constrained and unconstrained nonlinear optimization problems. The search direction algorithms available in INTEROP include: modified Fletcher-Powell, modified Fletcher-Reeves, steepest-descent Newton, homogeneous predictor, and modified Powell. The program is dimensioned for a maximum of 20 parameters and 20 states. (ERA citation 08:022848)...Software Description: CDC CYBER173;CDC6600,7600; FORTRAN IV (90%) and COMPASS (10%); SCOPE 3.4.4 (CDC6600), SCOPE 2.1.3 (CDC7600); INTEROP requires approximately 130K (octal) words for execution on a CDC6600 and 76K (octal) words on a CDC7600.

PAMA; Preferred Acquisition Method Analysis.
R. G. Jones.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-867 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048867 Price code: CP T11

PAMA is an interactive COBOL program which through an inquiry procedure calculates the preferred method of acquisition of ADP equipment. The Preferred Acquisition Method Analysis leads to a lease, lease with conversion to purchase, or lease to ownership (or deferred purchase) versus purchase analysis. This methodology is intended to be applied to small procurements under $400,000 and to sole source procurements over $400,000, and can provide budget-supporting justification for all procurements. For the larger competitive procurements, a purchase versus lease methodology based on monthly life cycle analysis is preferred. Deviation from the standard cost elements or other special situations must be processed as hand-entered adjustments. Adjustments cannot be made to lease payments. (ERA citation 08:022849)...Software Description: CDC6600; COBOL; NOS and SCOPE 3.4.4; 66,000 (octal) words of memory are required for PAMA.

PECS3; Probabilistic Evaluation Cladding Life.
W. S. Lovejoy, M. R. Patel, D. G. Hoover, and F. J. Krommenhock.
General Electric Co., Sunnyvale, CA. Fast Breeder Reactor Dept. 1984, mag tape ANL/NESC-868R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048868 Price code: CP T11

PECS3 is designed to calculate the probability distributions for various lifetime criteria for sealed plenum FBR fuel pins. The PECS model is capable of predicting cladding stresses and strains and accumulated damage due to fission gas pressure and fuel-cladding mechanical interaction. The position of failure may be located by analyzing a single pin at more than one axial location. Whole-core analyses may be performed by modeling up to 30 pin groups simultaneously. The damage rule and failure criteria used are selectable by the user for each analysis. Maxima of 200 hour time-step, 30 rod groups, 10 burnup increments per rod group, 100 bins per damage fraction histogram, 100 bins per optional graph, 80 bins per time-to-failure histogram. Minimum of 25 hour time-step. The user can generate a regression equation predicting a selected response as a function of up to 19 selected independent variables. (ERA citation 08:020413)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1; 53,000 (octal) words of small core memory and 65,000 (octal) words of large core memory are necessary for execution.

THERPP; Thermodynamic Properties of Hydrocarbons.
R. S. Deeds.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-869 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048869 Price code: CP T09

THERPP computes thermodynamic properties of light hydrocarbons and mixtures of light hydrocarbons. Properties can be generated in the form of either a pressure-temperature grid or a pressure-enthalpy grid. With its current dimensioning. THERPP can handle grid sizes up to 30x30, for mixtures containing up to 15 components. Fluids for which the program has been tested are methane, ethane, propane, isobutane, n-butane, isopentane, n-pentane, n-heptane, n-octane, ethylene, propylene, nitrogen, carbon dioxide and hydrogen sulfide. (ERA citation 08:021153)...Software Description: CDC7600; IBM360,370,303x; FORTRAN IV; SCOPE 2.1 (CDC7600), OS/360 (IBM360), OS/370 (IBM370,303x); 36,000 (octal) words of memory are necessary for execution of the CDC7600 version and 155K bytes for execution of the IBM360 version. The IBM and CDC conversion programs require 45K bytes and 5,000 (octal) words of memory, respectively.

BNWIGL;UNIWIGL; Two-Group Time-Dependent, One-Dimensional Diffusion.
C. M. Heeb, W. W. Porath, and H. Toffer.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-870R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048870 Price code: CP T15

BNWIGL and UNIWIGL solve the one-dimensional, two-energy group, time-dependent diffusion theory equation with thermal feedback. The stand-alone, one-dimensional, steady-

state diffusion theory code, HFN, is incorporated to perform critical searches and to determine the initial direct and adjoint fluxes for input to the time-dependent calculation. Problems in slab, cylindrical, and spherical geometries with up to six delayed neutron groups can be solved. Thermal feedback is introduced through the solution of the non-boiling heat transfer equations. Transients can be initiated either from changes in the thermal-hydraulic parameters or by simulated control rod movement in either of the two independent pseudo-rod models. Effects of two and three dimensions can be simulated through the use of interpolation tables for control rod worths and Doppler weighting factors. The total storage set aside for all parameters is 16,000 words for the CDC6600 version and 12,000 for the UNIVAC1108 version. Storage is dynamically allocated permitting the user to establish tradeoffs in use of spatial detail, numbers of materials, and delayed neutron groups. (ERA citation 08; 022510)...Software Description: UNIVAC1108,1100;CDC6600; FORTRAN (99%) and COMPASS (1%) (CDC6600), FORTRAN V (UNIVAC1108); SCOPE 3.4.4 (CDC6600), EXEC8 (UNIVAC1108); If the programs are segmented, 154,000 (octal) words of memory are required for execution of UNIWIGL (CDC6600), and 51,000 words of memory are required for BNWIGL.

ICARUS; Redundant System Unavailability Model.
J. K. Vaurio, and D. Sciaudone.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-871R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048871 Price code: CP T09

ICARUS calculates the unavailability characteristics of a periodically tested standby system with m-out-of-n redundancy (1.LE.m.LE.n.LE.4). The main functions of the program are to calculate the average unavailability, the optimum test interval, and fractional unavailabilities due to testing, repair, and random failures for three different testing strategies. The program will also calculate the average unavailability as a function of the test interval at each point in the range 0.2T(optimum) to 1.8T(optimum) at intervals of 0.2T(optimum). ICARUS can be used to evaluate sensitivities to different failure modes and data, as well as current testing or repair strategies, to determine if changes to these strategies will optimize the system availability. The system configuration is limited to m/n with 1.LE.m.LE.n.LE.4. The three testing strategies allowed are random, uniformly staggered, and nearly simultaneous. In the random scheme, the components are tested at randomly shifted times throughout the test interval. The uniformly staggered scheme performs the component tests at equally-spaced times throughout the test interval. In the nearly simultaneous schemes, all components are tested consecutively at the beginning of the interval. The equations assume only one component per redundancy. However, redundancies with several components in series can be analyzed by properly defining the failure data for a series system in terms of the data for individual components. (ERA citation 08:020668)...Software Description: IBM370,303x; FORTRAN IV; OS/370; 60K bytes of memory are required for execution of the program.

CATCH; Map Projection Subroutine Package.
T. C. Tucker, and L. J. Campbell.
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div. 1984, mag tape ANL/NESC-872 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048872 Price code: CP T11

CATCH (Computer-Assisted Topography, Cartography, and Hypsography) is a compatible and extensible collection of subroutines to perform a number of common map projection calculations. Included in the collection are the Albers equal area, the Lambert conformal, the Universal Transverse Mercator, the U.S. Polyconic, and the various state plane coordinate systems. Optional higher-level subroutines having the projection name as one parameter, are provided to call the projection subroutines. This facilitates use of the projection subroutines in applications programs. A general subroutine for bilinear transformation of one quadrilateral to another was developed for translating, rotating, and scaling the plane coordinates and can be used for very large-scale, approximate projections. The Clarke 1866 spheroid is assumed but a subroutine is included to simplify changing to any other ellipsoid. (ERA citation 08:022850)...Software Description: IBM360,370,303x; FORTRAN IV; OS/370; 152K bytes of storage are required for execution.

COAST4; Costing and Sizing of Tokamak Reactors.
D. A. Sink, and E. M. Iwinski.
Westinghouse Electric Corp., Pittsburgh, PA. Fusion Power Systems Dept. 1984, mag tape ANL/NESC-873 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048873 Price code: CP T13

Devices which can be sized and costed include: TFTR (Tokamak Fusion Test Reactor), The Next Step (TNS) devices, fusion-fission hybrids, engineering demonstration reactors, and power producing reactors. Both the ignition mode and the neutral-beam-driven mode of plasma operation are modeled. The plasma engineering calculations involve zero-dimensional models which account for energy balance, particle balance, alpha-particle effects, slowing-down theory, plasma-plasma and beam-plasma fusion reaction rates, impurity effects, and profile effects. The tokamak engineering calculations account for poloidal and toroidal magnetic field coil assemblies (both superconducting and copper conductors are possible), neutral beam injectors, blanket/shield assemblies, plasma fueling, divertors, heat dissipation systems, and related power supplies. The reactor cell containing the tokamak device, the turbine-generator plant and facility, and balance-of-plant systems are taken into account. The amount of output produced is controlled by user-specified input. The output data may consist of simply a summary table of the main plasma, engineering, and cost data, or may be expanded to include a complete set of results characterizing the plasma during burn as well as start-up; the neutral beam system; the fusile fuel system loads; blanket/shield assembly sizing; divertor parameters; poloidal field coil geometry, electrical data, self and mutual inductances, and time profiles of currents, voltages, powers, and energy utilization; toroidal field coil assembly and power supply data; heat and electrical power generation data; device radial and vertical geometry tables; detailed electrical data; component costs; annual operating costs; and a summary of the Fusion Reactor Economic Evaluation. (ERA citation 08:022686)...Software Description: CDC7600; FORTRAN; SCOPE; 107K memory.

SANDIA-ORIGEN; Isotope Generation and Depletion.
D. E. Bennett.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-874 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048874 Price code: CP T13

SANDIA-ORIGEN is a point code (no spatial dependence) which calculates detailed isotopic compositions for a wide range of problems involving nuclear reactor fuel irradiation, neutron activation, and radioactive decay. A nuclear data library file of 1,063 isotopes provides nuclear parameters, neutron cross sections, and gamma photon production data for four reactor types: high-temperature, gas-cooled (HTGR), light water (LWR), liquid-metal fast-breeder (LMFBR), and molten-salt breeder (MSBR). Versatile options for blending and reprocessing of reactor fuel are included. Maxima of 10 discrete time-steps per subcase. (ERA citation 08:019901)...Software Description: (CDC7600,6600,6400; FORTRAN IV (FTN4.6(439) FORTRAN compiler, optimization level 2); SCOPE 2.1.5; Approximately 104K (octal) words of SCM and 156K (octal) words of LCM are required for execution on a CDC7600.

TSOAK-M1; Analysis of Fusion Detritiation Data.
R. H. Land, V. A. Maroni, and M. Minkoff.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-875 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048875 Price code: CP T12

TSOAK-M1 analyzes the reaction/adsorption/release mechanisms taking place in a large enclosure following release of large quantities of tritium. It is designed to analyze experimental tritium cleanup data in terms of these mechanisms and to perform correlations with and extensions to actual building enclosures. Maximum of 500 experimental data points. (ERA citation 08:022687)...Software Description: IBM370,303x; FORTRAN IV; OS/370; 400K bytes of memory are required.

K-TIF; Two-Fluid PWR Downcomer Fluid Dynamics.
A. A. Amsden, and F. H. Harlow.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-876 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048876 Price code: CP T11

K-TIF was developed for the numerical solution of the time-varying dynamics of steam and water in a pressurized water reactor (PWR) downcomer. The model is designed to describe the complicated countercurrent flow under start up, steady state and transient flow conditions covering as wide a set of experimental configurations as possible. The material speeds are assumed to be much smaller than the sound speed at each point so that the microscopic material density for each phase is independent of position. (ERA citaion 08:020351)...Software Description: CDC7600; FORTRAN (LRLTRAN and CHAT compiler); LTSS, SCOPE; 31,000 (octal) words of small core memory (SCM) and 28,000 (octal) words of large core memory.

K-FIX;3D; Three-Dimensional Extension Two-Phase Flow Dynamics.
W. C. Rivard, and M. D. Torrey.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-877 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048877 Price code: CP T15

This package consists of two programs K-FIX(3D) and K-FIX(3D,FLX) which extend the transient, two-dimensional, two-fluid program K-FIX (NESC Abstract 727) to perform three-dimensional calculations. The transient dynamics of three-dimensional, two-phase flow with interfacial exchange are calculated at all flow speeds. Each phase is described in terms of its own density, velocity, and temperature. The application is to flow in the annulus between two cylinders where the inner cylinder moves periodically perpendicular to its axis. K-FIX(3D) is easily adaptable to a variety of two phase flow problems while K-FIX(3D,FLX) combines KFIX(3D), the three-dimensional version of the KFIX code, with the three-dimensional, elastic shell code FLX for application to a very specific class of problems. KFIX(3D,FLX) was developed specifically to calculate the coupled fluid-structure dynamics of a light water reactor core support barrel under accident conditions. Motion may be induced by blowdown, prescribed displacement, or seismic action. (ERA citation 08:020553)...Software Description: CDC7600; FORTRAN IV; SCOPE; The K-FIX(3D) sample problem, excluding plotting and timing routines, took about 50,000 (octal) words of small core memory (SCM) and 65,000 (octal) words of large core memory (LCM) storage. The K-FIX(3D,FLX) sample problem, excluding plotting and timing routines, took about 71,300 (octal) words of SCM and 570,000 (octal) words of LCM storage.

APARNA2; One-Dimensional Integral Neutron Transport in Slab Geometries.
R. Vaidyanathan.
Reactor Research Centre, Kalpakkam (India). Reactor Physics Section. 1984, mag tape ANL/NESC-878 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048878 Price code: CP T03

APARNA2 solves the one-dimensional integral neutron transport equation with anisotropic scattering in slab geometry. The problem size is restricted by memory size. The system is assumed to be non-regenerative. The boundary conditions are arbitrary incoming flux at the left boundary with the right boundary assumed non-reentrant. In addition, extraneous sources can be distributed inside the medium. (ERA citation 08:022511)...Software Description: IBM370,303x; FORTRAN IV; OS/370; 400K bytes of memory are required.

SAMPLE; Monte Carlo Uncertainty Analysis Code.
F. F. Goldberg.
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Regulatory Research. 1984, mag tape ANL/NESC-879 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048879 Price code: CP T03

The SAMPLE program uses Monte Carlo simulation to compute the mean, standard deviation, probability range, and distribution for the function y= f(x(1), x(2), . .x(k)) given that the

distributions of x(1), x(2), ..x(k) are known and the functional dependence of y on the x's is known. The program permits normal, log-normal, and log-uniform distribution types to be specified for the input variables, and all of the input variables must have the same distribution type. Other distribution types and changes allowing each variable to have any of the distribution types could easily to added. (ERA citation 08:022851)...Software Description: IBM360,370,303x; FORTRAN IV; OS/360,370; 140K bytes were required to execute the sample problem.

ACSAP; Resonance Region Cross Section Analysis.
N. H. Marshall, J. W. Codding, O. D. Simpson, J. R. Smith, and R. C. Young.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-880 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048880 Price code: CP T12

ACSAP may be used to compute neutron cross section data from neutron resonance input. Total, fission, capture, or scattering cross section data may be computed. Experimental data may be compared by means of a wide selection of representations. ACSAP can also determine cross section resonance parameters from input experimental data. Maxima of 250 resonances 100 resonance parameters which can be adjusted simultaneously 25 different isotopes 20 points to be fit in valleys between resonances. ACSAP does not adjust the alignment of interfering resonances and the signs of the interference terms. The interference terms. The program returns appreciable errors when used with light nuclides. (ERA citation 08:022512)...Software Description:IBM360,370,303x; FORTRAN IV (92%) and BAL (8%); OS/360,370; 230K bytes of memory are needed for execution of the program; additional memory is required if plotting is desired. Three direct access devices are used to store temporarily calculated theoretical cross sections (logical unit 10), experimental data (unit 11), and difference tables.

ELEFUNT; Tests of FORTRAN Elementary Functions.
W. J. Cody.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-881 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048881 Price code: CP T11

ELEFUNT is a FORTRAN test package for the elementary functions. Each program is an aggressive test of one or more of the elementary function subroutines generally supplied with the support library accompanying a FORTRAN compiler. Functions tested are ALOG/ALOG10, ASIN/ACOS, ATAN, EXP, POWER, SIN/COS, SINH/COSH, SQRT, TAN/COTAN, and TANH. The package contains one subroutine (MACHAR) for dynamic determination of parameters describing the floating-point arithmetic system of the host machine. Should this hardware-sensitive subprogram malfunction, the test programs must be modified to insert the necessary machine-dependent parameters in DATA statements, or otherwise make them available. This computing environment inquiry routine is known to malfunction when the arithmetic registers are wider than the storage registers. (ERA citation 08:022852)...Software Description: IBM360,370,303x;CDC6600,7600; UNIVAC1108,1100; FORTRAN; OS/370 (IBM3033), SCOPE 3.4.4 (CDC6600), SCOPE 2.1.5 (CDC7600), and EXEC8 (UNIVAC1100); The maximum space required by any one test driver is 50K bytes on an IBM3033, 16,000 (octal) words on a CDC6600, 5700 (octal) words on a CDC7600, and 3600 words on a UNIVAC1100/44.

GSMP; General Systems Analysis Modeling Code.
J. M. Cook.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-882 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048882 Price code: CP T14

The General System Modeling Program (GSMP) is designed for use by systems analysis teams. Though developed primarily for the modeling of advanced energy conversion systems, it is designed to model any object satisfying the most general definition of the word 'system'. Given compiled subroutines that model the behavior of components plus instructions as to how they are to be interconnected, GSMP links them together to model a complete system. Standard system-analytic services are provided: parameter sweeps, graphics, free-form input and formatted output, file storage and retrieval, error diagnostics, component model and integration checkout facilities, sensitivity analysis, and an optimizer with nonlinear constraint capability. Steady-state or cyclic time-dependence is simulated directly, initial-value problems only indirectly. (ERA citation 08:022853)...Software Description: IBM370,303x; PL/I (90%), FORTRAN IV (9%), and Assembly language (1%); OS/370. If the system optimization capability is invoked, storage requirements vary from approximately 0.5 to 1 megabyte or more depending on the size of the system model.

NJOY; Neutron and Photon Cross Sections from ENDF/B.
R. E. MacFarlane, D. W. Muir, and R. M. Boicourt.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-883 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048883 Price code: CP T99

The NJOY nuclear data processing system is a comprehensive set of processing modules for producing pointwise and multigroup cross sections for neutron and photon transport calculations from ENDF/B-IV and -V evaluated nuclear data. Each module performs a well-defined processing task. RECONR reconstructs pointwise (energy-dependent) cross sections from ENDF/B resonance parameters and interpolation schemes. BROADR Doppler-broadens and thins pointwise cross sections. UNRESR computes effective self-shielded pointwise cross sections in the unresolved-resonance region. HEATR generates pointwise heat production cross sections (kerma factors) and radiation-damage-energy production cross sections. THERMR produces incoherent inelastic energy-to-energy matrices for free or bound scatterers, coherent elastic cross sections for hexagonal materials, and incoherent elastic cross sections. GROUPR generates self-shielded multigroup cross sections, group-to-group neutron scattering matrices, and photon production matrices from pointwise input. GAMINR calculates multigroup photon interaction cross sections and kerma factors and group-to-group photon scattering matrices. ERRORR produces multigroup covariance matrices from ENDF/B uncertainties. COVR reads the ERRORR output and performs covariance plotting and output formatting. DTFR formats multigroup data for use in transport codes, such as DTF4 and ANISN. CCCCR formats

multigroup data for the CCCC standard interface files ISOTXS, BRKOXS, and DLAYXS. MATXSR formats multigroup data for the cross section interface file MATXS. MODER changes ENDF/B and ENDF-like NJOY interface files from formatted decimal format (BCD or ASCII) into a blocked binary format and back. The ACER module prepares libraries for the Los Alamos continuous-energy Monte Carlo code MCNP, and POWR prepares libraries for the proprietary EPRI-CELL and EPRI-CPM power reactor fuel-cycle codes. (ERA citation 08:022513)...Software Description: CDC7600; FORTRAN; SCOPE 2.1.5; 607K memory.

VUGRAPH; Plots Presentation-Quality Viewgraphs.
R. J. Knox.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-884 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048884 Price code: CP T03

VuGRAPH offers a convenient means of generating professional quality four-color viewgraph transparencies (or small posters) in a variety of character sizes and styles using the HP9825A minicomputer with the HP9872A plotter system. Horizontal plots normally are contained within a 7.5 inch wide x 6.25 inch high rectangle, with optional expansion to 9 inches x 7 inches. Vertical plots are contained within a 7 inch wide x 9 inch high rectangle. Text lines in a choice of four colors may be oriented horizontally or vertically. Character size and aspect ratio are continuously variable. Type styles include italics and some other modifications of the minicomputer's basic character set. (ERA citation 08:022854)...Software Description: HP9825A; HPL; An HP9825S system, consisting of an HP9825A desktop computer with 23K bytes of memory, and equipped with both the String-Advanced Programming ROM and the Plotter-General I/O ROM and an HP9827A plotter are required.

SWAAM1; LMFBR Sodium-Water Reaction Analysis.
Y. W. Shin, C. K. Youngdahl, C. A. Ket, H. C. Lin, and B. J. Hsiah.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-885R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048885 Price code: CP T15

SWAAM1 is designed for analysis of the major consequences of large-scale sodium-water reactions in the secondary system of an LMFBR. For a typical system analysis, SWAAM1 treats rapid-transient effects of the order of 1 second or less of real time. The program computes coupled transient events in the shell-side sodium, the tube-side water/steam systems, and the reaction-bubble zone resulting from tube failures. From 8 to 50 elements can be used to represent the single-membrane disk. (ERA citation 08:020414)...Software Description: IBM370,3033; FORTRAN IV; OS/370 (IBM370), OS/3033 (IBM3033); 950K bytes of memory are required for execution.

EQ3/6; Chemical Equilibrium of Aqueous Systems.
T. J. Wolery.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-886 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048886 Price code: CP T15

The EQ3/6 version .2055U software computes thermodynamic equilibrium models for aqueous solution-mineral systems. It consists of two main programs, EQ3 and EQ6. EQ3 performs distribution-of-species calculations for natural water compositions; EQ6 uses the results of EQ3 to predict the consequences of heating and cooling aqueous solutions and of irreversible reaction in rock-water systems. The programs can be used to study such phenomena as the formation of ore bodies, scaling and plugging in geothermal development, and the long-term disposal of nuclear waste. Calculations are allowed in the temperature interval 0-350C, at either 1 atm-steam saturation pressures or a constant 500 bars. The activity coefficient approximations for aqueous solutes limit modeling to solutions of ionic strength less than about one molal. (ERA citation 08:021154)...Software Description: CDC7600;CRAY1; FORTRAN Extended 4.6 (CDC7600) and CFT (CRAY1); SCOPE 2 (CDC7600); About 45,000 (octal) words of SCM and 58,000 (octal) words of LCM are required on a CDC7600 for EQ3, about 125,000 (octal) words of SCM and 32,000 (octal) words of LCM for EQ6. Four units in addition to thestandard input/output units are used by EQ3, ten units in addition to the standard I/O units by EQ6.

GETOUT; Radionuclide Transport Geologic Media.
M. O. Cloninger, W. V. DeMier, P. J. Liddell, and H. C. Burkholder.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-887 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048887 Price code: CP T12

GETOUT is a set of four FORTRAN programs and associated subroutines developed as an aid to investigate the migration of radionuclide chains from an underground source. The model to be analyzed is an underground nuclear waste disposal site and a uniform one-dimensional soil column that connects the site with a surface water body. At an arbitrary time after the waste is deposited, the radioactive material is released to an underground aquifer which flows at constant velocity directly through the soil column into the surface water body. The program takes into account the complications introduced by the radioactive decay of first-order chains to produce other species which have different absorption characteristics and, in turn, decay at different rates. Maxima of 88 discharge profiles 51 single chains 26 two-member chains 11 three-member chains. (ERA citation 08:021870)...Software Description: UNIVAC1100; FORTRAN; EXEC8; Program ONE requires 29,000 words of main memory and 205,000 words of direct access storage for execution. Programs TWO and THREE require 31,000 words of main memory and 86,000 and 47,000 words of direct access storage, respectively, and program FOUR requires 44,000 words of main memory and an additional 475,000 words of direct access storage for execution.

MINPACK1; Nonlinear Equations and Least Squares.
B. S. Garbow.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-888 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.

DE83048888 Price code: CP T16

MINPACK1 is a package of FORTRAN subprograms for the numerical solution of systems of nonlinear equations and nonlinear least squares problems. The individual subprograms are: IDENTIFICATION DESCRIPTION CHKDER Check gradients for consistency with functions DOGLEG Determine combination of Gauss-Newton and gradient directions DPMPAR Provide double precision machine parameters ENORM Calculate Euclidean norm of vector FDJAC1 Calculate difference approximation to Jacobian (nonlinear equations) FDJAC2 Calculate difference approximation to Jacobian (least squares) HYBRD Solve system of nonlinear equations (approximate Jacobian) HYBRD1 Easy-to-use driver for HYBRD HYBRJ Solve system of nonlinear equations (analytic Jacobian) HYBRJ1 Easy-to-use driver for HYBRJ LMDER Solve nonlinear least squares problem (analytic Jacobian) LMDER1 Easy-to-use driver for LMDER LMDIF Solve nonlinear least squares problem (approximate Jacobian) LMDIF1 Easy-to-use driver for LMDIF LMPAR Determine Levenberg-Marquardt parameter LMSTR Solve nonlinear least squares problem (analytic Jacobian, storage conserving) LMSTR1 Easy-to-use driver for LMSTR QFORM Accumulate orthogonal matrix from QR factorization QRFAC Compute QR factorization of rectangular matrix QRSOLV Complete solution of least squares problem RWUPDT Update QR factorization after row addition R1MPYQ Apply orthogonal transformations from QR factorization R1UPDT Update QR factorization after rank-1 addition SPMPAR Provide single precision machine parameters. (ERA citation 08:022855)...Software Description: IBM360,370 (designed to be machine-independent); FORTRAN IV; OS/360 (IBM360), OS/370 (IBM370); The test executions require from 92K to 158K bytes of storage.

RAS; Reliability Analysis for Phased Missions.
D. M. Rasmuson, N. H. Marshall, and G. R. Burdick.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-889 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048889 Price code: CP T14

The Reliability Analysis System, RAS, is an integrated package of computer programs for the quantification of fault trees. In particular, RAS has the capability of performing phased mission analysis. A phased mission is a task to be performed by a system during which the logic model and/or the component failure mode characteristics change at predetermined times. RAS is capable of finding minimal cut sets from fault trees and of calculating reliability characteristics for the basic events, the minimal cut sets, and the top event of a fault tree. In addition, mission cut set cancellation and four methods of bounding mission unreliability have been incorporated into RAS. Maxima of 5 distinct phases per mission. (ERA citation 08:020669)...Software Description: CDC CYBER176; CDC7600,6600; FORTRAN IV (96%) and COMPASS (4%); SCOPE 2.1 (CDC7600), NOS/BE (CDC CYBER176,CDC6600); If the program is segmented, 42,000 (octal) words of small core memory (SCM) and 10 (octal) words of large core memory (LCM) are required for execution on a CDC7600. For the CDC6600, 135,000 (octal) words of central memory and 10 (octal) words of Extended Core Storage (ECS) are required. Without segmentation, additional memory will be required.

SAFE; Fail-to-Safe Analysis of Protective Networks.
J. M. Kontoleon.
Wollongong Univ. (Australia). Dept. of Electrical Engineering. 1984, mag tape ANL/NESC-890 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048890 Price code: CP T03

SAFE is designed to analyze the fail-to-safe (FS) and fail-to-danger (FD) probabilities of failure of large protective networks, such as those associated with nuclear reactor protective systems. Components of the protective network may include sensors, safety lines, and logic units which have either an m-out-of-n or a majority voting configuration. Sensors and safety lines may fail in either a FS or FD mode of failure. The overall logic protective network is modeled as a network with three types of nodes - input, buffer, and logic - and arcs. The nodes specify the components involved in the logic network and the arcs their interconnections. The nodes are numbered successively to provide a simple description of the logic protective network to the computer. The simulation of unreliable logic nodes is done by the use of reliable logic nodes and unreliable buffer nodes. The program can also be used in the evaluation of the probability of occurrence of the top event in a fault tree, provided the bottom events are s-independent and not mutually exclusive. Maxima of 100 buffer nodes 100 input nodes 50 logic nodes. The program makes the following assumptions: a) All nodes are s-independent. b) Logic nodes are perfectly reliable. c) Input nodes, buffer nodes, and the protective network itself can be in either a good, fail-to-safe, or fail-to-danger state. d) A failed input or buffer node cannot become good or change mode of failure. (ERA citation 08:020670)...Software Description: UNIVAC1106,1100; FORTRAN IV, ASCII FORTRAN (FTN) compiler; EXEC8 Level 36; 44,000 words of memory are required for execution.

ANALYZE; Hydrothermal Reservoir Test Analysis.
S. M. Benson, and D. McEdwards.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-891 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048891 Price code: CP T09

ANALYZE is a history matching program designed for the analysis of both interference tests and production tests in single phase, fluid saturated reservoirs. The analytic solution calculates pressure responses in an isothermal, isotropic, homogeneous, porous medium of constant thickness and infinite areal extent. The production well is modeled as a fully penetrating line source. Flow in the reservoir is horizontal and of uniform flux over the height of the well. Linear boundaries are modeled using the method of images. By minimizing the difference between a set of measured pressure points and a set of calculated pressure points the program returns the reservoir parameters of transmissivity, storativity, and distance to a single linear reservoir boundary. In addition, for analysis of production well data, a "skin" value indicative of the wellbore condition can be obtained. The technique employed allows the simultaneous analysis of pressure data from up to twenty observation wells, each influenced by the production and/or injection of as many as 20 wells with arbitrarily varying flow rates. Maxima of 20 observation wells 99 observation points per well 250 flow rate points per production well. (ERA citation 08:020170)...Software Description: CDC7600; FORTRAN IV (99%) and COMPASS (1%); SCOPE 2.1.5; 27,000 (octal) words of SCM and 107,000 (octal) words of LCM storage.

CCC; One-Phase Conduction Convection Compaction.
D. C. Mangold, M. J. Lippmann, and G. S. Bodvarsson.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-892 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048892 Price code: CP T11

The numerical model CCC (conduction-convection-consolidation) solves the heat and mass flow equations for a fully, liquid-saturated, anisotropic porous medium and computes one-dimensional (vertical) consolidation of the simulated systems. The model has been applied to problems in the fields of geothermal reservoir engineering, aquifer thermal energy storage, well testing, radioactive waste isolation, and in situ coal combustion. The code has been validated against analytic solutions for fluid and heat flow, and against a field experiment for underground storage of hot water. Maximum of 12 materials. It is assumed that - (a) Darcy's law adequately describes fluid movement through fractured and porous media. (b) The rock and fluid are in thermal equilibrium at any given time. (c) Energy changes due to the fluid compressibility, acceleration, and viscous dissipation are neglected. (d) One-dimensional consolidation theory adequately describes the vertical deformation of the medium. (ERA citation 08:020171)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1.5; 66,000 (octal) words of memory.

SHAFT79; Two-Phase Geothermal Reservoir Model.
K. Pruess, and R. C. Schroeder.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-893 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048893 Price code: CP T16

SHAFT79 (Simultaneous Heat And Fluid Transport) is an integrated finite difference program for computing two-phase non-isothermal flow in porous media. Although designed for simulating production and injection in geothermal reservoirs, it is, or can be readily modified to be, applicable to other two-phase problems. SHAFT79 solves coupled mass and energy balance equations based on the following major assumptions: the physical system is a system of porous rock saturated with a one-component fluid in liquid and vapor form; all rock properties, except porosity, i.e., density, specific heat, thermal conductivity, and absolute permeability are independent of temperature, pressure, or vapor saturation; and liquid, vapor, and rock matrix are at the same temperature and pressure at all times. Capillary pressure is neglected. SHAFT79 has been developed only for systems of water and rock. The fluid table covers most of the equation of state of water substance in the temperature range of 5 to 400C and the pressure range of 0.5 to 220 bars, which is adequate for most geothermal applications. (ERA citation 08:020172)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1; 725,000 (octal) words of storage are required.

TERZAGI; Isothermal Fluid Flow and Subsidence.
T. N. Narasimhan.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-894 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048894 Price code: CP T12

TERZAGI solves for transient and steady-state fluid potentials in one-, two- or three-dimensional saturated, deformable systems, such as artesian aquifers or petroleum reservoirs. The system can be made up of porous or fractured materials and can have complex geometry. The flow region can be heterogeneous and anisotropy can be handled by orienting surfaces of volume elements normal to principal axes of permeability. The material properties such as permeability and matrix compressibility can be functions of pressure. Boundary conditions can be functions of potential or time. The program has been applied to problems related to ground subsidence, flow in fractured rocks, and hydraulic fracturing and has been extensively validated. (ERA citation 08:020173)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1.5 (CDC7600), NOS 1.3 (CYBER175); 106,000 (octal) words of main memory are required for execution.

WELBORE; Transient Wellbore Fluid Flow Model.
C. W. Miller.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-895 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048895 Price code: CP T09

WELBORE is a code to solve transient, one-dimensional two-phase or single-phase non-isothermal fluid flow in a wellbore. The primary thermodynamic variables used in solving the equations are the pressure and specific energy. An equation of state subroutine provides the density, quality, and temperature. The heat loss out of the wellbore is calculated by solving a radial diffusion equation for the temperature changes outside the bore. The calculation is done at each node point in the wellbore. (ERA citation 08:020174)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1.5; 55,000 (octal) words of SCM storage.

TIDY-J; FORTRAN Source Code Editing Processor.
W. H. Hightower, Jr., and S. W. O'Rear.
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab. 1984, mag tape ANL/NESC-896 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048896 Price code: CP T11

TIDY-J is a utility program for processing FORTRAN source programs into a standard form which is easy to read and modify. In processing FORTRAN source statements it left-justifies statement labels and renumbers them to appear in increasing order, removes statement labels from unreferenced statements, deletes unreferenced FORMAT and unnumbered CONTINUE statements, deletes consecutive blank comment cards in excess of two, and inserts identification in columns 73-79. All statements, including comments, are aligned to begin in column 7. FORMAT statements are either collected at the end of the code, or optionally, left where they appear. Blank characters are inserted in statements and removed from them to improve readability. TIDY-J also provides a limited set of FORTRAN diagnostics on such errors as missing or duplicate statement numbers, asymmetric parentheses count, illegal DO-loop indexing, illegal statements, and inaccessible parts of the program. If the program contains a reference to non-existent statement numbers, TIDY-J generates pseudo statement numbers to replace these numbers in the referencing statements. Maxima of 19 continuation cards 1000 unique

statement numbers per subprogram. (ERA citation 08:022856)...Software Description: IBM360,370,303x; FORTRAN IV; OS/MVT or OS/MVS; Two mass storage devices, logical units 8 and 9, are used for temporary storage. New 'TIDYed' decks are punched on cards (logical unit 7). 150K bytes of memory are required for TIDY-J execution.

PL-MOD; Fault Tree Analysis by Modularization.
J. Olmos, L. Wolf, and N. Rasmussen.
Massachusetts Inst. of Tech., Cambridge. 1984, mag tape ANL/NESC-897 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048897 Price code: CP T11

PL-MOD performs an analysis of operating systems modeled by means of fault trees using modularization techniques. The program was developed to perform the modularization and evaluation of the modular occurrence probabilities and Vesely-Fussell importance measures for analysis of nuclear reactor safety system fault trees efficiently. It is capable of modularizing fault trees containing replicated components and replicated modular gates and can handle mutually exclusive inputs and explicit higher order symmetric (k-out-of-n) gates. PL-MOD is limited to steady-state occurrence probabilities. Only replicated gates representing a supercomponent event independent from all other gates in the tree may be treated. (ERA citation 08:022857)...Software Description: IBM370,303x; PL/I; OS/VS1 (IBM370/168) and OS/MVT (IBM3033); 200K bytes of memory are required for execution.

OCTAVIA; Pressure Vessel Failure Probabilities.
W. E. Vessly, E. K. Lynn, and F. F. Goldberg.
National Research Council, Washington, DC. 1984, mag tape ANL/NESC-898 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048898 Price code: CP T09

OCTAVIA (Operationally Caused Transients And Vessel Integrity Analysis) calculates the probability of pressure vessel failure from operationally-caused pressure transients which can occur in a pressurized water reactor (PWR). For specified vessel and operating environment characteristics the program computes the failure pressure at which the vessel will fail for different-sized flaws existing in the beltline and the probability of vessel failure per reactor year due to the flaw. The probabilities are summed over the various flaw sizes to obtain the total vessel failure probability. Sensitivity studies can be performed to investigate different vessel or operating characteristics in the same computer run. Maxima of 100 temperatures 12 fluences 8 flaw sizes with the program's current dimensioning. Only axially oriented flaws in the vessel beltline are considered. (ERA citation 08:020573)...Software Description: IBM370,303x; FORTRAN IV; OS/370; OCTAVIA requires approximately 170K bytes of storage for execution of the sample problem on an IBM370/195 or 3033.

ANGCOR; Directional Correlation Coefficients.
W. D. Ruhter.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-899 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048899 Price code: CP T09

ANGCOR calculates gamma-gamma directional correlation coefficients and mixing ratios. The program allows the user to compare experimental correlations with theoretical expectations and to simulate data for experimental analysis. Input is restricted to no more than ten angles. Correlations are limited to successive gamma-ray cascades. (ERA citation 08:022514)...Software Description: CDC6600,7600; FORTRAN IV, SCOPE 3.4 and INTERCOM 4.5 (CDC6600), SCOPE 2.1 (CDC7600); 26,500 (octal) words of memory are required for batch-mode processing, 55,000 (octal) words of memory for interactive operation.

SALE2D; General Transient Fluid Flow Algorithm.
A. A. Amsden, C. W. Hirt, and H. M. Ruppel.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-900 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048900 Price code: CP T12

SALE2D calculates two-dimensional fluid flows at all speeds, from the incompressible limit to highly supersonic. An implicit treatment of the pressure calculation similar to that in the Implicit Continuous-fluid Eulerian (ICE) technique provides this flow speed flexibility. In addition, the computing mesh may move with the fluid in a typical Lagrangian fashion, be held fixed in an Eulerian manner, or move in some arbitrarily specified way to provide a continuous rezoning capability. This latitude results from use of an Arbitrary Lagrangian-Eulerian (ALE) treatment of the mesh. The partial differential equations solved are the Navier-Stokes equations and the mass and internal energy equations. The fluid pressure is determined from an equation of state and supplemented with an artificial viscous pressure for the computation of shock waves. The computing mesh consists of a two-dimensional network of quadrilateral cells for either cylindrical or Cartesian coordinates, and a variety of user-selectable boundary conditions are provided in the program. Reference report, LA-8095. (ERA citation 08:021418)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1, LTSS, NOS 1.3; 165,000 (octal) words of memory are required for the report version, which allows up to 800 mesh points. The memory requirement will increase if more mesh points are used.

PAD; One-Dimensional Coupled SN Neutronics and Hydrodynamics.
D. M. Peterson, W. R. Stratton, T. P. McLaughlin, and H. M. Forehand, Jr.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-901 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048901 Price code: CP T16

The PAjarito Dynamics (PAD) program models dynamic systems with interactive neutronics, thermodynamics, and hydrodynamics in one-dimensional spherical, cylindrical, and planar geometries. The program has been applied to prompt critical excursions in various fissioning systems (solution, metal, LMFBR, etc.) as well as to nonfissioning systems. PAD applications have included: controlled (nondestructive) and damaging reactor transient experiments, hypothetical LMFBR disassembly and recriticality accidents, hypothetical criticality ac-

cidents involving the handling and processing of various forms of fissile materials, and nonneutronic systems employing only the thermodynamic and hydrodynamic aspects of the program. Maxima of 100 hydrodynamic regions 40 materials 16 neutron energy groups. (ERA citation 08:020671)...Software Description: CDC7600,6600,6400; FORTRAN IV (RUN compiler); SCOPE 2.1.5 (CDC7600); PAD requires system input and output units and a bulk storage device (e.g., disk or tape) on which four coded files may be defined. Each file should have a 32,000 (octal), 60-bit word capacity. PAD requires approximately 140K (octal) words of storage for execution on a CDC7600.

QLN1; Quantitative gamma-Ray Spectra Analysis.
H. P. Yule.
NUS Corp., Gaithersburg, MD. 1984, mag tape ANL/NESC-902 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048902 Price code: CP T13

QLN1 identifies gamma-ray emitters contributing to Ge(Li) detector spectra, and computes quantitative amounts of isotopes contributing to the data. Maximum of 100 peaks per spectrum. (ERA citation 08:021567)...Software Description: UNIVAC1108,1100; FORTRAN V; EXEC8; The LISTER program requires 35,000 words of memory and 5 direct-access devices (logical units 10, 14, 28, 29, and 31) for execution. QLN1 requires 47,000 words of memory and 5 direct-access devices (logical units 14, 20, 21, 22, and 23) for execution.

COLCO; Thermal Diffusion Column Coefficients.
W. M. Rutherford.
Monsanto Research Corp., Miamisburg, OH. Mound. 1984, mag tape ANL/NESC-903 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048903 Price code: CP T09

COLCO calculates thermal diffusion column coefficients from theory. The program can be used for both liquid-phase and gas-phase thermal diffusion columns. Column coefficients for the gas-phase can be based on gas properties calculated from kinetics theory using tables of omega integrals or on tables of compiled physical properties as functions of temperature. Column coefficients for the liquid-phase can be based on compiled physical property tables. Maxima of 100 temperature points 100 omega integrals 50 entries in the gas property table 50 entries in the liquid property table. (ERA citation 08:019903...Software Description: IBM360,303x;CDC6600,CYBER175; FORTRAN IV; OS/360 (IBM360), SCOPE 3.4, NOS/BE 1.3 (CDC6600); 70K bytes of memory are required for execution of the IBM360 version; 23,000 (octal) words of memory are required for the CDC6600 version.

SUPERENERGY2; Steady-State LMFBR Core Analysis.
K. L. Basehore, and N. E. Todreas.
Virginia Electric and Power Co., Richmond. 1984, mag tape ANL/NESC-904R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048904 Price code: CP T13

SUPERENERGY2 was written to perform steady-state, thermal-hydraulic design and performance analyses on multiple LMFBR assemblies. The code automatically generates the geometry and nodes for any number of single- or double-ducted assembly types based on a few critical dimensions. Radial node options are either a standard fine-mesh subchannel layout based on the number of fuel pins or a lumped representation of one to eight rings formed at the user's request. Assemblies may be coupled for interassembly heat transfer effects, using either a conduction or flow solution in the interassembly gap. Generalized boundary conditions can be applied to the noncoupled bundle faces, and a duct wall gamma heating option is available. The code contains default sodium and stainless steel property correlations; mixing parameter flowsplit, and heat transfer correlations; all can be overriden by input data. The calculated bundle temperature profiles are printed in map form at specified locations for ease of use. SUPERENERGY2 can compute problems ranging from a single bundle operating condition parametric study to a large core sector problem determining the effect of interassembly heat transfer on the duct temperature profile for core restraint analysis. SUPERENERGY2 is applicable only to LMFBR assemblies in the steady-state forced convection flow regime. (ERA citation 08:020415)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1; NOS 1.3. Storage requirements vary with problem size. For the given dimensions 53K words of small core memory (SCM) and 66K of large core memory (LCM) are required. The program can also be executed entirely in SCM. If this is the case 155,000 (octal) words of memory are required. The auxiliary program CONVERT requires 21,000 (octal) words of memory for execution.

GWCORE; GSPC 79 Core Graphics Routines Package.
P. Wenner.
George Washington Univ., Washington, DC. 1984, mag tape ANL/NESC-905 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048905 Price code: CP T18

This package of FORTRAN callable subroutines is an implementation of the 1979 ACM SIGGRAPH core graphics specification. It is a machine-independent, device-independent output only (at this time) graphics language. It provides the primitives - lines, markers, polylines, polymarkers, polygons, moves, and text, as well as segmentation capabilities which permit many control functions such as visibility, highlighting, new frames, detectability, and image transformation. virtual size of application programs written with GWCORE is one-half million bytes. Integer*4 and real variables are also used so the system is not directly usable on 16-bit machines. (ERA citation 08:022858)...Software Description: DEC VAX11/780; FORTRAN IV PLUS; VMS 1.6, VMS 2.3; 500K bytes of memory.

DSTRESS; Transient Fuel Model for Clad Strain.
G. L. Fox.
Hanford Engineering Development Lab., Richland, WA. 1984, mag tape ANL/NESC-906R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048906 Price code: CP T11

DSTRESS calculates cladding strains produced by the fuel when a fuel pin is subjected to an overpower transient. The mechanistic fuel model calculates fuel stresses with high creep rates, melting, cracking, and the accommodation of

thermal expansion by the crack volume. Maxima of 99 temperature-time points 22 fuel mesh points 1 cladding mesh point 7 pairs of print intervals. The fuel temperature history must be supplied as input data. Cracked fuel is assumed to have an infinite number of cracks in a particular direction so the stress normal to the crack is equal to the negative of the crack gas pressure. Cracks in the circumferential direction are not allowed. (ERA citation 08:020672)...Software Description: CDC6600,CYBER175; FORTRAN IV; SCOPE 3.4 (CDC6600), NOS 1.3 (CDC CYBER175); DSTRESS requires 43,000 (octal) words of memory for execution. The plotting program, PLOTR, requires 61,000 (octal) words of memory, DSTRESS creates a data file used as input to PLOTR on logical unit 8.

SOLCOST3.0; Solar Heating and Cooling Design.
L. J. Lantz.
Solar Environmental Engineering Co., Inc., Fort Collins, CO. 1984, mag tape ANL/NESC-907 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048907 Price code: CP T15

The SOLCOST solar energy design program is intended for sizing and evaluating several types of solar systems for residential and single-zone commercial buildings including service hot water and space heating systems using liquid or air collectors. Other systems incorporating heat pumps and absorption cooling are also available but are still being validated. The SOLCOST program computes an optimum solar collector area and tilt angle from an analysis of life cycle cost differences for a solar system versus a reference (conventional) HVAC system. This computation utilizes historical solar radiation and weather data for 336 cities to perform one day long computation for each month of the year. The program predicts the annual fraction of heating or cooling load provided by the solar system, the optimum collector area and tilt angle for the installation, and a detailed cash flow summary including payback and rate of return for the optimum collector area. (ERA citation 08:020081)...Software Description: CDC CYBER172,175; FORTRAN IV; NOS 1.3; 74,000 (octal) words of memory are needed to execute SOLCOST. The interactive input program requires 115,000 (octal) words of memory. However, by using the auxiliary subroutines included in the package, the interactive input program can be reduced to 65,000 (octal) words of memory.

AERIN; Radioactive Aerosol Dose Calculations.
P. G. Voilleque, and R. L. Dickson.
Department of Energy, Idaho Falls, ID. Idaho Operations Office. 1984, mag tape ANL/NESC-908 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048908 Price code: CP T09

AERIN calculates organ and tissue burdens and doses resulting from acute exposure to a radioactive aerosol as a function of time after exposure. The International Commission on Radiological Protection (ICRP) model proposed by the Task Group on Lung Dynamics is used to predict deposition and retention of the aerosol in the lungs. Maxima of 9 organs 299 calculations per organ. It is assumed that the blood acts only as a mechanism for the transport of material to the various body organs and tissues and need not be considered a separate compartment. (ERA citation 08:021940)...Software Description: IBM360,303x; FORTRAN IV; OS/360; 105K bytes of memory are required for execution.

FC;LSEI;WNNLS; Constrained Least Squares Fit.
R. J. Hanson, and K. H. Haskell.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-909 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048909 Price code: CP T12

FC allows a user to fit discrete data, in a weighted least-squares sense, using piece-wise polynomial functions represented by B-splines on a given set of knots. In addition to the least-squares fitting of the data, equality, inequality, and periodic constraints at a discrete, user-specified set of points can be imposed on the fitted curve or its derivatives. The subprograms LSEI and WNNLS solve the linearly-constrained least-squares problem. LSEI solves the class of problem with general inequality constraints, and, if requested, obtains a covariance matrix of the solution parameters. WNNLS solves the class of problem with nonnegativity constraints. It is anticipated that most users will find LSEI suitable for their needs; however, users with inequalities that are single bounds on variables may wish to use WNNLS. Reference reports, SAND78-1290, SAND78-1291. (ERA citation 08:022859)...Software Description: CDC6600,7600,CYBER175 (designed to be machine-independent); FORTRAN IV; NOS 1.4 (CDC6600), SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 37,000 (octal) words of storage are needed to execute the sample driver that is provided. The storage required is a linear function of the number of data points plus a quadratic function of the number of piecewise polynomial coefficients. The code is edited output produced by the FORTRAN preprocessor, FLECS.

GRAIL; A Device-Independent Graphics Language.
J. A. Brooking, and N. Schaller.
Knolls Atomic Power Lab., Schenectady, NY. 1984, mag tape ANL/NESC-910 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048910 Price code: CP T15

GRAIL is designed to be a graphical, device-independent, picture description system. GRAIL was designed to alleviate the software maintenance burden imposed by having several types of devices capable of generating graphical output under the control of applications programs. GRAIL is used through FORTRAN subroutine calls to describe a picture or set of pictures. These calls generate a GRAIL file which, when interpreted by post-processor programs, will generate pictures on any graphics device the user chooses. (ERA citation 08:022860)...Software Description: CDC6600,7600; FORTRAN IV (81%) and COMPASS (19%); NOS/BE 1.3 and SCOPE 3.2 (CDC6600), SCOPE 1.1 (CDC7600); The two GRAIL test programs require approximately 22,700 (octal) words for execution. The post-processor program, GRACAL, executes in approximately 30,100 (octal) words of central memory. (RAIL has been used in conjunction with Calcomp, CDC280 COM, Versatec, and GOULD plotting devices).

DESA; District Energy System Cost Energy Model.
E. L. Morofsky, and V. Verma.
Public Works Canada, Ottawa, Ontario. 1984, mag tape ANL/NESC-911R U.S. Sales Only. Price includes

documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048911 Price code: CP T13

DESA (District Energy System Analysis) is a computerized design and cost energy accounting model that facilitates analysis of alternative methods of providing heating, cooling, and electrical power generation to urban areas. The model will develop the dollar and energy costs of a proposed system from specified demand load configuration of the system, the location and type of central plant, and certain financial assumptions. Comparisons are based on present value dollar costs for construction and operation over the life cycle of a system and the number of energy units consumed in the creation and operation of the energy supply systems. DESA is intended for application at the feasibility stage. The model permits selection of alternative energy sources to produce heating, cooling, and electrical power generation, and can provide cost and service comparisons for alternative development plans. Sources can include oil, gas, or coal, refuse through incineration or pyrolysis, and waste heat. The fuel selected is burned to heat water or produce steam, which can be used to run turbines that generate electricity, drive centrifugal chillers for cooling services, or simply to provide heating services. In cases where electrical generation is chosen as an option, the waste heat produced in the generation process can be used to provide buildings with heating and cooling (absorption) through either hot water or steam. Maxima of 300 network nodes (includes buildings, branch points, and plants) 3 plants 30 years project life. (ERA citation 08:020994)...Software Description: IBM370,303x; FORTRAN IV; OS/370; Each of the seven DESA modules can execute in 140K bytes of memory.

MOCARS; MC Distribution and Simulation Limits.
S. D. Matthews, and J. P. Poloski.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-912 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048912 Price code: CP T12

MOCARS uses Monte Carlo techniques to determine the distribution and simulation limits for a function. MOCARS randomly samples data from any of 12 different probability distributions and either evaluates a user-specified function or cut set system unavailability using the sample data. After ordering the data, the values at various quantities and associated confidence bounds are calculated. The available distributions are uniform, exponential, normal, binomial, Poisson, lognormal, Weibull, gamma, beta, Cauchy, Pearson Type IV, and empirical. If the cut set unavailability function is evaluated, MOCARS can determine the importance ranking for components in the unavailability calculation. Frequency and cumulative distribution histograms are also calculated from the sample data. Maxima of 20 quantile values. When calculating component importance, sampling distributions are assumed to be normal, lognormal, or exponential. (ERA citation 08:022861)...Software Description: CDC CYBER76;CDC7600; FORTRAN IV (76%) and COMPASS (24%); SCOPE 2.1; If a segmented load is performed, 15,000 (octal) words of memory are required for execution. Without segment loading additional memory will be needed.

LPMGB; Linear Programming Subroutine with Bounds.
R. J. Hanson, and J. A. Wisniewski.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-913 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048913 Price code: CP T12

LPMGB minimizes a linear function of several variables subject to linear equality constraints with bounds on selected variables. If the problem has M constraint equations in N variables, the extra storage, excluding data, is a linear function of M and N+ (M*M) memory locations. (ERA citation 08:022862)...Software Description: CDC7600,CYBER175;IBM370,303x; FORTRAN; OS/370 (IBM370), SCOPE 2.1 (CDC7600). NOS 1.3 (CDC CYBER175); 27,000 (octal) words of memory are needed to execute the CDC 7600 version with the test driver that is provided; the IBM370 version requires 120K bytes of memory.

PESTS; Thermo-Hydraulic System Data Analysis.
G. L. Bordner.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-914R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048914 Price code: CP T03

PESTS is a statistical model for the analysis of steady-state thermo-hydraulic data from experimental loops or operating power plants. The analysis, based on estimation theory, provides a means for improving the accuracy of estimates of system parameters and for resolving small discrepancies in system heat balances. Additionally, when significant errors are present in the data, this model provides an indication of which sensors are suspect. User-supplied input to the PESTS (Parameter Estimation in Steady Thermal Systems) program consists of steady-state data from a thermo-hydraulic system along with error estimates for the sensors and a set of simple equations, such as component heat balances, which describe the system. Using statistical techniques, the program determines revised estimates of the system parameters which are more accurate than the raw data and which can be used as a basis for verifying the accuracy of individual sensors. PESTS was developed for the analysis of experimental data from the Sodium Loop Safety Facility (SLSF) but is adaptable to other systems. (ERA citation 08:020244)...Software Description: IBM370,303x; FORTRAN IV; OS/370; 70K bytes of memory are required for execution.

CHECKER;CRECT;STNDRD;FIZCON; PSYCHE;RESEND;INTER;INTEND;SUMRIZ;PLOTEF;LSTFCV;RIGEL ENDF/B V5 Processing Codes.
C. L. Dunford.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-915 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048915 Price code: CP T16

This collection of ENDF/B processing codes consists of twelve programs for processing ENDF/B (Evaluated Nuclear Data File Version B) Version-V data files. The programs perform the following functions: CHECKER checks ENDF/B data files for legal formats. CRECT corrects an ENDF/B BCD tape by inserting and deleting data. STNDRD standardizes ENDF/B data formats (removing E's in exponential format and in-

serting zeroes in control cards where necessary), resequences files, and creates or updates the dictionary for all materials. FIZCON checks ENDF/B data for physics consistency and to see that recommended procedures are followed. PSYCHE performs physics checks of ENDF/B data, calculates resonance integrals, checks secondary particle energy conservation, and performs reaction Q-value and Chart-of-the-Nuclides tests. RESEND generates infinitely dilute unbroadened point cross sections in the ENDF format by combining ENDF File 3 background cross sections with points calculated from File 2 resonance parameter data. INTER is a special version of the general-purpose ENDF integration program INTEND. INTEND is a general-purpose program which generates energy integrals from the ENDF/B cross section files using an arbitrary weight function and an arbitrary energy grid. SUMRIZ creates a summary for an ENDF material. A description and selection of useful data are written in each case. PLOTEF plots the ENDF/B data according to material number and file number from BCD input in standard, rather than alternate, format. LSTFCV produces interpreted listings of information from a BCD standard arrangement ENDF/B tape. RIGEL selectively or in toto retrieves ENDF/B data from one to nine ENDF/B tapes, merges the retrieved ENDF/B data onto from one to eight ENDF/B result tapes, changes the arrangement (standard to alternate or vice versa), and changes the mode (BCD to binary or vice versa). (ERA citation 08:022891)...Software Description: CDC6600,CYBER175; FORTRAN IV; SCOPE(CDC6600), NOS(CYBER175); Machine requirement is 117K.

UT200; DEC Emulation of CDC 200 User Terminal.
V. Crow.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-916 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048916 Price code: CP T03

The UT200 program enables a properly configured DEC PDP-11 to be used as a remote job entry (RJE) terminal with CDC data processing equipment. (ERA citation 08:022863)...Software Description: DEC PDP-11; PAL PDP-11 assembly language; CAPS-11; 10K words of memory and the following input/output devices are needed: VT05, VT50, or VT52 CRT terminal, LP-11 line printer, CR-11 card reader, and DP-11 synchronous line interface. In addition, a TA-11 cassette unit, or alternative device, must be available to assemble and load the program.

RELAP5/MOD1/018; LWR Loss of Coolant Analysis.
V. H. Ransom, R. J. Wagner, K. E. Carlson, J. A. Trapp, and D. M. Kiser.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-917 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048917 Price code: CP T18

RELAP5 was developed to describe the behavior of a light water reactor (LWR) subjected to postulated transients such as loss of coolant from large or small pipe breaks, pump failures, etc. RELAP5 calculates fluid conditions such as velocities, pressures, densities, qualities, temperatures; thermal conditions such as surface temperatures, temperature distributions, heat fluxes; pump conditions; trip conditions; reactor power and reactivity from point reactor kinetics; and control system variables. In addition to reactor applications, the program can be applied to transient analysis of other thermal-hydraulic systems with water as the fluid. RELAP5 uses a five equation two-phase flow hydrodynamic model consisting of the two phasic continuity equations, the two phasic momentum equations, and an overall energy equation augmented by the requirement that one of the phases is assumed saturated. In this model only two interphase constitutive relations are required, those for interphase drag and interphase mass exchange. Models are included for abrupt area changes, choking, mass transfer, interphase drag, wall friction, and branching. The limitations on the number of hydrodynamic volumes, heat structures, trips, minor edits, etc. are primarily dictated by the available memory of the computer. Dynamic allocation of storage is used for all problem-dependent data. Design of the fields used for input data can also impose limits. Problems with over 150 hydrodynamic volumes and over 100 heat structures have been run on a CYBER176 using 270K of SCM and 200K of LCM storage for input processing and less during transient analysis. (ERA citation 08:020673)...Software Description: CDC CYBER176;CDC7600; FORTRAN IV (90%) and COMPASS (10%); NOS/BE (CDC CYBER176), SCOPE 2.1.5 (CDC7600); RELAP5 has run on a 64K CDC7600 and a 132K CYBER176 both with and without use of LCM storage. The RELAP5 package contains options (implemented through the CDC UPDATE utility program) intended to allow RELAP5 implementation on a CYBER76 operating under SCOPE2 and a CYBER170 or similar CYBER series hardware under NOS/BE.

LASO; Block Lanczos Symmetric Eigenvalue Code.
D. S. Scott.
Union Carbide Corp., Oak Ridge, TN. Nuclear Div. 1984, mag tape ANL/NESC-918 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048918 Price code: CP T13

LASO is a package of subroutines developed for solving large sparse symmetric eigenvalue problems. There are two driver subroutines, one to determine a fixed number of eigenvalues and eigenvectors at one end of the spectrum of a large sparse symmetric matrix and the other to determine all the eigenvalues and eigenvectors of a large sparse symmetric matrix outside a user-defined excluded interval. Both are available in both single and double precision applicable to short word-length (32-bit) and longer word-length hardware. (ERA citation 08:022864)...Software Description: IBM360,370,303x (designed to be machine-independent); FORTRAN IV; OS/370 MVT and MVS; 500K bytes of memory are needed for compilation and 180K bytes are used for the double precision execution of the sample problem.

SALE; Analytical Chemistry Quality Control.
W. J. Bush, and C. D. Gentillon.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-919 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048919 Price code: CP T13

The Safeguards Analytical Laboratory Evaluation (SALE) program is a statistical analysis program written to analyze the data received from laboratories participating in the SALE quality control and evaluation program. The system is aimed at identifying and reducing analytical chemical measurement

errors. Samples of well-characterized materials are distributed to laboratory participants at periodic intervals for determination of uranium or plutonium concentration and isotropic distributions. The results of these determinations are statistically evaluated and participants are informed of the accuracy and precision of their results. Up to 1500 pieces of data for each nuclear material sampled by a maximum of 75 laboratories may be analyzed. (ERA citation 08:021192)...Software Description: IBM360,3033; FORTRAN IV (97%) and Assembly language (3%); OS/360; 380K bytes of memory are required for execution.

DEVOG; Coupled Molecular Scattering Equations.
L. D. Thomas.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-920 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048920 Price code: CP T11

DEVOG solves the coupled, second-order differential equations of atomic and molecular quantum scattering theory. The program is independent of the chemical system or the method (close coupling, coupled states, etc.). The physical problem is defined by user-supplied subroutines, POT and LIST. The number of coupled equations which can be solved depends on the amount of main memory available. (ERA citation 08:022334)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 144,000 (octal) words of memory are required to execute the sample problem.

PC; Coupled Molecular Scattering Equations.
L. D. Thomas.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-921 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048921 Price code: CP T11

PC solves the coupled, second-order differential equations of atomic and molecular quantum scattering theory. The program is independent of the chemical system or the method (close coupling, coupled states, etc.). The physical problem is defined by user-supplied subroutines, POT and LIST. The number of coupled equations which can be solved depends on the amount of main memory available. (ERA citation 08:022335)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 143,000 (octal) words of memory are required to execute the sample problem.

DACRIN; Radiation Organ Dose from Inhalation.
J. R. Houston, D. L. Strenge, and E. C. Watson.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-923 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048923 Price code: CP T12

DACRIN is designed to provide rapid and consistent estimates of the effective radiation dose to the human respiratory tract and other organs resulting from the inhalation of radioactive aerosols. The program will calculate the effective radiation dose to any of 18 organs and tissues from inhalation of any one or a combination of radionuclides considered by the International Commission on Radiological Protection (ICRP). Input to the program consists of a few program control variables, the duration of inhalation exposure, ventilation rate, the time interval within which the dose is delivered, the organs of interest, the quantity of the radionuclide inhaled, its solubility class and particle size, and, when an atmospheric dispersion model is invoked, the additional parameters required for the model selected. Output provided by DACRIN consists of the effective radiation dose to the specified organs at selected time intervals for each radionuclide inhaled as indicated by the input data. Maxima of 10 downwind distances at which dose is calculated 10 organs 10 time intervals measured from the most recent intake 5 multiple intake intervals. (ERA citation 08:021941)...Software Description: UNIVAC1100; FORTRAN; EXEC8; 56,000 words of memory are needed to execute the program.

SUBDOSA; External Dose Airborne Radionuclides.
D. L. Strenge, E. C. Watson, and J. R. Houston.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-924 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048924 Price code: CP T12

SUBDOSA calculates external gamma and beta doses to individuals from the accidental release of radionuclides to the atmosphere. Doses are calculated as a function of: quantity released, duration of release, atmospheric conditions during the release, and horizontal distance from the release point. Doses from both gamma and beta radiation are calculated as a function of depth in tissue, summed and reported as skin, eye, gonadal, and total body dose. Doses are calculated within each of several release time intervals with separate nuclide inventories and atmospheric dispersion conditions used for each interval. Radioactive decay using a chain decay scheme with branching to account for transitions to and from isomeric states is considered during the release. The program computes normalized air concentrations at ground level as a function of distance from the point of release. Maxima of 500 nuclides 10 downwind distances 6 release time intervals 4 tissue depths. SUBDOSA does not consider the dose resulting from radionuclides deposited in the body and its organs via inhalation. (ERA citation 08:021942)...Software Description: UNIVAC1100; FORTRAN; EXEC8; 43,000 words of memory are needed for execution of SUBDOSA. BIVAR, an auxiliary program which calculates dose rate factors as a function of energy, requires 13,000 words of memory.

ARRRG;FOOD; Aquatic and Terrestrial Radiation.
B. A. Napier, R. L. Roswell, W. E. Kennedy, Jr., and D. L. Strenge.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-925 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048925 Price code: CP T12

ARRRG calculates radiation doses to humans for radionuclides released to bodies of water from which people might obtain fish, other aquatic foods, or drinking water, and in which they might fish, swim, or boat. FOOD calculates radiation doses to humans from deposition on farm or garden soil and crops during either an atmospheric or water release of radionuclides. Deposition may be either directly from the air or

from irrigation water. With both programs, doses may be calculated for either a maximum-exposed individual or for a population group. Doses calculated are a one-year dose and a committed dose from one year of exposure. The exposure is usually considered as chronic; however, equations are included to calculate dose and dose commitment from acute, one-time, exposure. Maxima of 23 possible body organs or tissues (ARRRG and FOOD) 5 organs and 100 radionuclides in a mixture (ARRRG and FOOD) 5 ingestion pathways (ARRRG) 3 external pathways (ARRRG) 14 food type pathways (FOOD) 1 external pathway (FOOD). (ERA citation 08:021943)...Software Description: UNIVAC1100; FORTRAN; EXEC8; 51,000 words of memory are required to execute ARRRG; 61,000 words are required by FOOD.

PABLM; Accumulated Environment Radiation Dose.
B. A. Napier, W. E. Kennedy, Jr., and J. K. Soldat.
Battelle Pacific Northwest Labs., Richland, WA. 1984, mag tape ANL/NESC-926 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048926 Price code: CP T12

PABLM calculates internal radiation doses to man from radionuclides in food products and external radiation doses from radionuclides in the environment. Radiation doses from radionuclides in the environment may be calculated from deposition on the soil or plants during an atmospheric or liquid release, or from exposure to residual radionuclides after the releases have ended. Radioactive decay is considered during the release, after deposition, and during holdup of food after harvest. The radiation dose models consider exposure to radionuclides deposited on the ground or crops from contaminated air or irrigation water, radionuclides in contaminated drinking water, aquatic foods raised in contaminated water, and radionuclides in bodies of water and sediments where people might fish, boat, or swim. For vegetation, the radiation dose model considers both direct deposition and uptake through roots. Doses may be calculated for either a maximum-exposed individual or for a population group. The program is designed to calculate accumulated radiation doses from the chronic ingestion of food products that contain radionuclides and doses from the external exposure to radionuclides in the environment. A first-year committed dose is calculated as well as an integrated dose for a selected number of years. Maxima of 23 possible body organs or tissues 19 ingestion pathways 5 organs and 100 radionuclides in a mixture 4 external exposure pathways. (ERA citation 08:021944)...Software Description: UNIVAC1100; FORTRAN; EXEC8; 80,000 words of memory are required to execute the PABLM program.

SPIRT; Stress-Strains from Transient Pressures.
L. J. Siefken.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-927 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048927 Price code: CP T13

The SPIRT (Stress-strains from Pressures Instigated by Reactor Transients) program was developed to predict the pressure generated by the rapid dispersal of molten UO2 from power-reactor-type fuel rods into the coolant water. This rapid dispersal of molten fuel results from very high-power excursions initiated by the rapid insertion of reactivity. SPIRT was used in the safety analyses of the ATR and ETR. The program can analyze the response of one-dimensional plane, cylindrical, and spherical geometric configurations to pressure-generating heat sources with free- or fixed-surface boundary conditions. SPIRT can calculate the response of systems to the dispersal of hot fuel particles as a function of the following variables: enthalpy of fuel at time of dispersal, rate at which fuel is dispersed, size of dispersed fuel droplets, dispersal density of fuel (grams of fuel dispersed per cc of water), quality of water at time of fuel dispersal, enthalpy of water at time of fuel dispersal, system pressure at time of fuel dispersal, and the size and constituency of the medium enveloping the dispersed fuel. By holding all but one of the listed variables constant, and varying that one, the program computes the relative effect of that variable upon the response of systems to the dispersal of hot fuel. SPIRT exists as two releases - one, written for UO2 fuel is called SPIRTU; the second, for uranium-aluminide fuel is identified as SPIRTA. (ERA citation 08:020674)...Software Description: CDC CYBER76,175; FORTRAN IV; SCOPE 2.1 (CDC CYBER76), NOS 1.3 (CDC CYBER175); SPIRTU and SPIRTA require approximately 173K (octal) words for execution under NOS 1.3.

TDELAY; Scattering Phase Shifts and Time Delays.
R. J. Le Roy, and L. R. Eyberger.
Waterloo Univ. (Ontario). 1984, mag tape ANL/NESC-928 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048928 Price code: CP T09

TDELAY solves the radial or one-dimensional Schroedinger equation for any given (smooth) potential in the continuum of energies above its "dissociation threshold" to determine the scattering phase shift and collisional time delay associated with any given energy and partial wave (angular momentum state). If desired, TDELAY will also automatically locate and determine the width of orbiting, or shape, resonances defined by local maxima of the collisional time delay as a function of energy. Maxima of 6001 potentials 6001 mesh points. (ERA citation 08:022336)...Software Description: IBM370,303x;CDC7600,CYBER175; FORTRAN IV; OS/370 (IBM370), SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 190K bytes of memory are required to execute the IBM370 version of TDELAY; the CDC7600 version requires 60,000 (octal) words.

QLEVEL; Potential Bound and Quasibound Levels.
R. J. Le Roy.
Waterloo Univ. (Ontario). 1984, mag tape ANL/NESC-929 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048929 Price code: CP T11

QLEVEL solves the radial or one-dimensional Schroedinger equation for any given (smooth) potential to determine its eigenvalues, eigenfunctions, and the expectation values of various operators for any bound or quasibound levels (orbiting or shape resonances) of the given potential. The program can automatically generate the whole manifold of vibrational and rotational levels of a potential from a single initial trial eigenvalue, and can generate and use any one of a wide variety of analytic potentials or use a numerical potential defined by a set of user-supplied points. Maxima of 6010 mesh points 210 turning points 200 levels at which a solution is desired. The

potential used must be smooth or care must be taken at points where it has discontinuous derivatives. (ERA citation 08:022866)...Software Description: IBM370,303x; FORTRAN IV; OS/370; 350K bytes of memory are required to execute the program.

LINSED; One-Dimensional Multireach Sediment Transport Model.
D. E. Fields.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-930 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048930 Price code: CP T09

LINSED consists of a driver program coupled with the SEDTRN model of sediment transport for a rectangular stream channel to allow simulation of sediment transport in a one-dimensional multi-reach channel system. The LINSED model can accept specification of a branching channel system of up to nine nominally homogeneous segments (reaches). Sediment input to each reach from external sources along the reach is permitted. (ERA citation 08:022027)...Software Description: IBM360,303x; FORTRAN IV; OS/360 (IBM360), OS/303x (IBM303x); 50,000 bytes of memory are required.

SCORE-EVET; Three-Dimensional Hydraulic Reactor Core Analysis.
R. L. Benedetti, L. V. Lords, and D. M. Kiser.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-931 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048931 Price code: CP T14

SCORE-EVET was developed to study multidimensional transient fluid flow in nuclear reactor fuel rod arrays. The conservation equations used were derived by volume averaging the transient compressible three-dimensional local continuum equations in Cartesian coordinates. No assumptions associated with subchannel flow have been incorporated into the derivation of the conservation equations. In addition to the three-dimensional fluid flow equations, the SCORE-EVET code contains a one-dimensional steady state solution scheme to initialize the flow field, steady state and transient fuel rod conduction models, and comprehensive correlation packages to describe fluid-to-fuel rod interfacial energy and momentum exchange. Velocity and pressure boundary conditions can be specified as a function of time and space to model reactor transient conditions, such as a hypothesized loss-of-coolant accident (LOCA) or flow blockage. The basic volume-averaged transient three-dimensional equations for flow in porous media are solved in their general form with constitutive relationships and boundary conditions tailored to define the porous medium as a matrix of fuel rods. By retaining generality in the form of the conservation equations, a wide range of fluid flow problem configurations, from computational regions representing a single fuel rod subchannel to multichannels, or even regions without a fuel rod, can be modeled without restrictive assumptions. The completeness of the conservation equations has allowed SCORE-EVET to be used, with modification to the constitutive relationships, to calculate three-dimensional laminar boundary layer development, flow fields in large bodies of water, and, with the addition of a turbulence model, turbulent flow in pipe expansions and tees. Maxima of 64 flow channels 40 cells in any one direction (boundary plus real cells) 40 possible loss coefficients. For the fuel rod thermal transport model, five nodes are allowed in the fuel and two nodes in the cladding. (ERA citation 08:020610)...Software Description: CDC7600, CYBER175; FORTRAN IV;SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 200,000 (octal) words of memory are required for execution.

WECS; Wind Energy Value to Electric Utilities.
S. Hock, J. R. Harper, C. D. Percival, and W. Fleck.
Solar Energy Research Inst., Golden, CO. 1984, mag tape ANL/NESC-932 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048932 Price code: CP T15

WECS is a package of five computer models developed by the Solar Energy Research Institute to implement a method for determining the value of Wind Energy Conversion Systems (WECS) to electric utilities. These models, WTP, WEIBUL, ROSEW, ULMOD, and FINAM, may be used with most utility planning models. The value determination procedure begins with the processing of weather data by either the WTP or WEIBUL program to produce hourly wind speed data or wind probability distributions for each hour of a monthly typical day, respectively. The function of WTP is to convert a single year of standard weather data into a format acceptable to the ROSEW program. WEIBUL is preferable to WTP if two or more years of weather data are available because its probabilistic representation of hourly wind speeds is more likely to represent the long-term wind speeds than WTP's hourly average wind speeds. ROSEW calculates the wind energy system hourly power output using weather data supplied and wind machine characteristics. For WTP-supplied weather data, a single hourly wind power is calculated. For WEIBUL-supplied weather data, a group of wind powers with associated probabilities for each hour is calculated. ULMOD uses the electricity production estimate calculated by ROSEW to reduce a user-supplied utility hourly-load forecast. This reduced load profile is then put into a variety of forms suitable for use with electric utility planning models (e.g. LOLP, PRODUCTION COSTING, GENERATION EXPANSION PLANNING). Utility load forecasting uncertainty can be reflected. FINAM is designed to determine the value (in $/kW) and marginal value of alternative electric utility investment options, such as Wind Energy Conservation Systems, by using base case utility operating data with up to ten change cases. (ERA citation 08:020206)...Software Description: The system is written in FORTRAN IV for implementation on a CDC7600 or CDC CYBER175 computer under the SCOPE 2.1 or NOS 1.2 operating system. Maximum required memory is 100K octal words for the CDC7600 and 200K for the CYBER175.

SCAP; Point Kernel Single or Albedo Scatter.
R. K. Disney, and S. E. Bevan.
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div. 1984, mag tape ANL/NESC-933R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048933 Price code: CP T11

SCAP solves for radiation transport in complex geometries using the single- or albedo-scatter point kernel method. The program is designed to calculate the neutron or gamma-ray radiation level at detector points located within or outside a

complex radiation scatter source geometry or a user-specified discrete scattering volume. The geometry is described by zones bounded by intersecting quadratic surfaces with an arbitrary maximum number of boundary surfaces per zone. The anisotropic point sources are described as point-wise energy dependent distributions of polar angles on a meridian; isotropic point sources may be specified also. The attenuation function for gamma rays is an exponential function on the primary source leg and the scatter leg with a buildup factor approximation to account for multiple scatter on the scatter leg. The neutron attenuation function is an exponential function using neutron removal cross sections on the primary source leg and scatter leg. Line or volumetric sources can be represented as distributions of isotropic point sources, with uncollided line-of-sight attenuation and buildup calculated between each source point and the detector point. The geometric zone description is restricted to zones defined by boundary surfaces defined by the general quadratic equation or one of its degenerate forms. Due to flexible dimensioning in SCAP, there are no restrictions on the number of energy groups or geometric zones. (ERA citation 08:022515)...Software Description: CDC7600,CYBER175; FORTRAN (99%) and COMPASS (1%); SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 55,000 (octal) words of memory are needed to execute the SCAP program on the CDC CYBER175.

NASA; MHD-Modified Chemical Equilibrium Code.
R. A. Sacks, H. K. Geyer, S. J. Grammel, and E. D. Doss.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-934R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048934 Price code: CP T12

NASA is a substantially modified release of the NASA-Lewis computer program for chemical equilibrium compositions. The modifications were designed to extend the program to perform combustor analysis for MHD systems studies. NASA calculates the thermodynamic and electrical properties of a chemically reactive gas mixture. The rocket, detonation, and constant volume equilibrium options of the parent code have been deleted. The new features added include: a) a routine for computing the electrical properties of the equilibrium mixture, b) shorthand input data option for treating standard hydrocarbon fuels, c) a facility for incorporating heat losses in the NASA HP mode computations, and d) a printed summary of equilibrium thermodynamic properties. Maxima of 250 species 5 elements per species. In the computation of the electrical properties of the plasma, only the following species are considered: hydroxyl, cesium, argon, carbon monoxide, carbon dioxide, nitrogen, oxygen, water, nitric acid, potassium hydroxide, sulfur dioxide, potassium, and electrons. (ERA citation 08:021419)...Software Description: IBM370,303x; FORTRAN (42%) and PL/I (58%); OS/MVT; 300K bytes of memory are generally sufficient to execute the NASA program.

IDAP; Interactive Decision Analysis Procedure.
M. J. Jusko, and R. G. Whitfield.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-935 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048935 Price code: CP T15

IDAP (Interactive Decision Analysis Procedure) is a program for creating, manipulating, and evaluating decision trees, which are representations of decision problems characterized by uncertain outcomes and multiple conflicting objectives. Capabilities of the program include: handling multiple decision nodes, including sequential decisions; handling discrete probability nodes with the number of branches virtually unlimited, so that a continuous probability function can be closely approximated; handling many attributes; accepting a wide variety of functional forms for marginal utility functions, including both discrete and continuous forms; treating multiattribute utility functions of either the additive or multiplicative form; calculating the expected utility for each decision alternative; identifying the optimal alternative, i.e. that which maximizes the expected utility; and performing sensitivity analyses by changing utility function parameters or attribute level tolls for nodes. The number of nodes in the user's decision tree is limited by the size of the main memory available. One node uses 94 bytes plus 4 bytes per attribute; a 1024-node 3-attribute tree requires an additional 106K bytes. (ERA citation 08:022867)...Software Description: IBM360,370,303x; PL/I; IBM OS/370 or IBM VM/370 under CMS; The program requires approximately 350K bytes of memory.

LCURVE; Learning Curve Production Calculations.
B. L. Hatcher.
General Electric Co., St. Petersburg, FL. Neutron Devices Dept. 1984, mag tape ANL/NESC-936 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048936 Price code: CP T03

LCURVE is a BASIC time-sharing computer program written to estimate the effort or dollars required to perform a task in a manufacturing process. The learning curve theory is that as quantities double, the rate of learning remains the same. For a 90 percent learning curve this means the second unit requires 90 percent of the hours needed to build the first unit, and the fourth unit requires 90 percent of the average hours needed to build the first two units. The percent learning curve to be used for the manufacturing process must be selected with care. If historical data are available, least squares analysis can be applied to determine the actual learning curve for a particular product and organization. (ERA citation 08:022868)...Software Description: Honeywell Series 60 Level 66 Model 20; BASIC; GCOS (Honeywell66/20), PT-11.

SOLCEL2; Simulation of Photovoltaic Systems.
E. R. Hoover, J. K. Linn, and P. A. Allen.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-937 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048937 Price code: CP T13

SOLCEL2 was developed as a system analysis tool for performing studies to identify and evaluate by hour-by-hour simulation promising photovoltaic (PV) applications. Made up of a collection of component model subroutines linked by an executive routine, SOLCEL2 allows the user to model a variety of system configurations with a minimum number of input variables. Hourly weather data and an hourly electrical load profile (unless the utility mode of operation is specified) for an entire year are required as input. Twelve different array orientation schemes are provided. The three basic types of collectors

modeled are flat-plate, linear-focus concentrator, and point-focus concentrator. Each of the three types has three options for cell cooling. Four different methods of modeling the photovoltaic conversion process are available including maximum power tracking, floating battery, voltage regulator, and temperature-degraded efficiency. The first three methods use a detailed solar cell model while the fourth uses a very simple temperature-corrected efficiency model. The logic for energy flow is fixed. The system's annual performance is assumed to be constant over its economic lifetime. (ERA citation 08:020031)...Software Description: CDC6600,7600,CYBER175; SOLCEL2 is written primarily in ANSI FORTRAN; NOS (CDC6600,CYBER175) and SCOPE 2.1 (CDC7600); 70,000 (octal) words of central memory are required to execute the program.

ORTEP2; Crystal Structure Illustration Plots.
C. K. Johnson.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-938 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048938 Price code: CP T12

ORTEP2 draws crystal structure illustrations using a CalComp plotter. Ball-and-stick type illustrations of publication quality are produced with either spheres or thermal-motion probability ellipsoids on the atomic sites. The program can produce stereoscopic pairs of illustrations which aid in the visualization of complex packing arrangements of atoms and thermal motion patterns. Interatomic distances, bond angles, and principal axes of thermal motion are calculated also as part of the structural study. ORTEP2 includes a hidden-line algorithm to eliminate those portions of atoms or bonds behind other atoms or bonds. Maxima of 599 stored bonds 166 atoms in the input list. (ERA citation 08:022547)...Software Description: IBM360,370,303x; FORTRAN IV (90%) and Assembly language (10%); OS/360; 284K bytes of memory and plotting devices.

INSCAT; Inelastic Scattering Method.
M. J. Redmon.
Chemical Dynamics Corp., Columbus, OH. 1984, mag tape ANL/NESC-940 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048940 Price code: CP T11

INSCAT solves the coupled, second-order differential equations of atomic and molecular quantum scattering theory. Maxima of 25 channels with the program's current dimensioning. (ERA citation 08:022337)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 113,000 (octal) words of memory are required to execute the sample problem.

LOGD; Multichannel LOG-Derivative Scattering.
B. R. Johnson.
Aerospace Corp., Los Angeles, CA. Chemistry and Physics Lab. 1984, mag tape ANL/NESC-941 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048941 Price code: CP T11

LOGD solves the close-coupled, Schroedinger equation of quantum scattering theory. An option for using a multi-channel WKB approximation is included in the program. Maximum of 10 coupled channels. (ERA citation 08:022338)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 102,000 (octal) wods of memory are required to execute the sample problem.

MNN; Solution of Close Coupling Equations.
D. G. Truhlar, D. Thirumalai, M. A. Brandt, and K. Onda.
Minnesota Univ., Minneapolis. Dept. of Chemistry. 1984, mag tape ANL/NESC-942 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048942 Price code: CP T12

MNN solves the coupled differential equations of the coupled-channel method for the quantum mechanical treatment of inelastic collisions of electrons, atoms, and molecules. The number of coupled equations which can be solved depends on the amount of main memory available. (ERA citation 08:022339)...Software Description: CDC7600,CYBER175,74; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175,74); 134,000 (octal) words of memory are required to execute the sample problem.

RIO; Power Plant Reliability Characteristics.
J. P. Poloski.
EG and G Idaho, Inc., Idaho Falls. 1984, mag tape ANL/NESC-943 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048943 Price code: CP T13

RIO, which consists of two FORTRAN programs, determines reliability importance and allocates optimal reliability goals for nuclear power plant safety systems. The first program, PHASE1, determines the importance of each safety system's contribution to overall plant risk and ranks the systems accordingly. The second program, PHASE2, is a nonlinear optimization code that determines optimal values of systems' reliability characteristics subject to the risk constraints imposed on the plant. Maxima of 150 accident sequences per release category (PHASE1) 25 events per accident sequence (PHASE1) 25 sets of data for describing the safety systems, initiators, and containment failure modes (PHASE1) 40 constraint equations (PHASE2) 20 independent variables (PHASE2). (ERA citation 08:020675)...Software Description: CDC7600,CYBER175; FORTRAN IV (86%) and COMPASS (14%); SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 30,000 (octal) words of memory are required by the PHASE1 program; PHASE2 requires 40,000 (octal) words.

SATDSK; Saturated Iron Magnetic Field Study.
G. S. McNeilly.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-944 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048944 Price code: CP T09

SATDSK is designed to calculate the median plane magnetic field in superconducting cyclotrons due to fully saturated iron poletips. Optionally, the program calculates the magnetic field due to disks of magnetic "charge", which can simulate the

effect of holes in the iron poletips or circular trim rods embedded in the poletip. SATDSK is intended for poletip geometries that are both symmetric about the median plane and have azimuthal sector symmetry. Maxima of 1001 points in the poletip arrays 100 poletip gap steps 17 magnetic charge disks. Magnetic fields are calculated only in the median plane for median-plane-symetric iron poletips. (ERA citation 08:021483)...Software Description: IBM360,370,303x; FORTRAN IV (89%) and Assembly language (11%); OS/MVT, OS/MVS; 165K bytes of memory are required to execute the program.

KAPPAS; Semiclassical Transmission Probability.
D. G. Truhlar, and B. C. Garrett.
Minnesota Univ., Minneapolis. Dept. of Chemistry. 1984, mag tape ANL/NESC-945 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048945 Price code: CP T09

KAPPAS computes semiclassical transmission probabilities for a one-dimensional potential energy barrier and thermally averages them to obtain transmission coefficients. The error caused by use of the semiclassical approximation as compared to quantum mechanics is generally ten percent or less for typical potential energy barriers representing chemical reactions. The potential function, which is user-supplied, must tend to zero as x approaches negative infinity and have a single maximum located at x= 0. (ERA citation 08:022340)...Software Description: CDC7600,CYBER74,175; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER74,175); 16,000 (octal) words of memory are required to execute the sample problem.

FLOCHT; Computer Drawn Flow Charts and Diagrams.
S. K. Fischer.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-946 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048946 Price code: CP T12

FLOCHT is a combination of a DEC PDP10 computer program, FLOW1, and an IBM360 program, FLOW2, designed to produce publication quality flow charts and diagrams from a rough draft. Use of FLOCHT requires a minimum knowledge of the computer systems. Both programs accept a maximum of 69 different instructions. (ERA citation 08:022870)...Software Description: DEC PDP10 with IBM360,370 or 303x; FORTRAN IV (99%), Assembly language (1%); OS/360 (FLOW2), TOPS-10 (FLOW1); 400K bytes of memory are required to execute the FLOW2 program.

CPDREV; Spare Parts Inventory Control System.
A. C. Morgenthaler.
Rockwell International, Richland, WA. Rockwell Hanford Operations. 1984, mag tape ANL/NESC-947 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048947 Price code: CP T99

CPDREV was developed to determine proper stock levels for an inventory of process spare parts. The program determines the amount of material to buy, and when it should be bought. CPDREV can compute an implied risk from a prespecified penalty cost, or conversely, the implied penalty cost from a prespecified risk level. The frequency of reordering is computed to provide a basis for distributing the projected workload among buyers and expeditors and to avoid an overstocked inventory. CPDREV is designed to assist maintenance managers in preparing spare parts purchase recommendations. CPDREV assumes that the inventory item has a predictable sales life, and that the transition costs of passing from one order period to the next consist primarily of the order costs, the inventory carrying costs, and the penalty costs caused by backordering customer requests. (ERA citation 08:022824)...Software Description: UNIVAC1100;CDC6600,CYBER74,175; FORTRAN (99%) and Assembly language (1%); EXEC8 (UNIVAC1100), SCOPE 3.4.4 (CDC6600,CYBER74), NOS 1.3 (CDC CYBER175); If the programs are segmented, 62,000 words of memory are required to execute the UNIVAC1100 version; the CDC6600 version requires 136,000 (octal) words on a CDC CYBER175.

SOLA-VOF; Transient Fluid Flow Free Boundaries.
B. D. Nichols, C. W. Hirt, and R. S. Hotchkiss.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-948 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048948 Price code: CP T11

SOLA-VOF is a program for the solution of two-dimensional transient fluid flow with free boundaries, based on the concept of a fractional volume of fluid (VOF). Its basic mode of operation is for single fluid calculations having multiple free surfaces. However, SOLA-VOF can also be used for calculations involving two fluids separated by a sharp interface. In either case, the fluids may be treated as incompressible or as having limited compressibility. Surface tension forces with wall adhesion are permitted in both cases. Internal obstacles may be defined by blocking out any desired combination of cells in the mesh, which is composed of rectangular cells of variable size. The setting of array dimensions is controlled through PARAMETER statements. (ERA citation 08:021420)...Software Description: CDC7600,CYBER175; FORTRAN FTN5 compiler; SCOPE (CDC7600), NOS (CDC CYBER175); 72,000 (octal) words of memory.

BECOM-BNL; Buildings Energy Optimization Model.
P. T. Kleeman, and F. Lipfert.
Brookhaven National Lab., Upton, NY. 1984, mag tape ANL/NESC-949 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048949 Price code: CP T13

BECOM-BNL, the Brookhaven Buildings Energy Conservation Optimization Model, is a linear programming representation of energy use in buildings. Starting with engineering and economic data on cost and performance of energy technologies used in buildings, including both conversion devices (such as heat pumps) and structural improvements, the model constructs alternative flows for energy through the technologies to meet demands for space heating, air conditioning, thermal applications, and electric lighting and appliances. Alternative paths have different costs and efficiencies. Within constraints such as total demand for energy services, retirement of existing buildings, seasonal operation of certain devices, and others, the model calculates an optimal configuration of

energy technologies in buildings. BECOM-BNL can model 25 energy conversion technologies and 8 structural technologies that can be used by 9 building types in each of 4 regions, and 72 separate building markets; 27 supply and 22 demand categories are included. (ERA citation 08:023795)...Software Description: CDC7600; PDS; SCOPE 2.1; 160,000 (octal) words of SCM (small core memory) and 140,000 (octal) words of LCM (large core memory) were required to run the sample problem.

ADVCON; Advance Control 93 APT Postprocessor.
G. A. O'Hare.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-950 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048950 Price code: CP T11

ADVCON is a numerical control postprocessor to support the Advance Control 93 R/D CNC routing/drilling machine. The postprocessor converts APT CL tape information produced by the APT processor into machine tool instructions so that the machine control unit can place a tool on a part to develop the desired geometric configuration. The postprocessor is concerned with machine tool geometry and dynamics as well as the control unit options and input characteristics. ADVCON produces punched cards or mylar tape containing the coded instructions to accomplish the desired result, i.e., movement of the machine tool. (ERA citation 08:024095)...Software Description: CDC CYBER174,175; FORTRAN IV; SCOPE 3.3; 54,000 (octal) words of memory are required for ADVCON, including section 0 and section 4 of APT.

PTTOPT; Point-to-Point Tool APT Postprocessor.
G. A. O'Hare.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-951 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048951 Price code: CP T11

PTTOPT is a numerical control postprocessor to support a number of point-to-point machine tools and their associated machine control units: Wiedeman N/C Turret Punch Press, Knight Model 65 Jig Borer, Burgmaster 2BHT Drill with Ferranti Control, Burgmaster 2BHT Drill with G.E. Control, Burgmaster 2BHT Drill with Pratt and Whitney Control, Burgmaster 3BHT Drill with G.E. Control, CSIP 3K Jig Borer with Sperry Control, and Moore Model 3 Jig Bore with Bendix Dynapath Control. This program converts APT processor output into machine tool language so that the machine control unit can develop a desired geometric configuration of a part. The postprocessor deals with machine tool geometry and dynamics as well as the control unit options and input characteristics. PTTOPT produces punched cards or mylar tape containing the coded instructions to accomplish the desired result, i.e., movement of the machine tool. (ERA citation 08:024096)...Software Description: CDC CYBER174,175; FORTRAN IV; SCOPE 3.3; 34,000 (octal) words of memory are required.

BXAMER; Hustler Two-Axis Lathe APT Postprocessor.
G. A. O'Hare.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-952 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048952 Price code: CP T12

BXAMER is a numerical control postprocessor to support an American 2010 Hustler, dual turret, 2-axis lathe with a General Automation control. The postprocessor converts information from the APT processor into machine tool instructions so that the machine control unit can place a tool on a part to develop the desired geometric configuration. The postprocessor is concerned with machine tool geometry and dynamics as well as the control unit options and input characteristics. The APT CL tape serves as input to the postprocessor. Output from the postprocessor is standard BCD punched cards or a punched mylar tape. Also included as output is a listing of the N/C machine used, delta distances, and the machine coordinate positions generated by the postprocessor. Only the machine x-z plane is currently available for circular interpolation. From the part programmer's viewpoint, the only restriction is that the tool be perpendicular to the plane of the circle. (ERA citation 08:024097)...Software Description: CDC CYBER174,175; FORTRAN IV (greater than 99%) and COMPASS (less than 1%); SCOPE 3.3; 41,000 (octal) words of memory are required.

OKUMA; OKUMA Two-Axis Lathe APT Postprocessor.
G. A. O'Hare.
Bendix Corp., Kansas City, MO. 1984, mag tape ANL/NESC-953 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048953 Price code: CP T12

OKUMA is a numerical control postprocessor to support the OKUMA LH50-N dual vertical turret, 2-axis CNC lathe with either an OSP2200L or OSP3000L control unit. The postprocessor converts information from the APT processor into machine tool instructions so that the machine control unit can place a tool on a part to develop a desired geometric configuration. The postprocessor deals with machine tool geometry and dynamics as well as the control unit options and input characteristics. The APT CL tape serves as input to the postprocessor. Output from the postprocessor is standard BCD punched cards or a punched mylar tape. Also included as output is a listing of the N/C machine used, delta distances, and the machine coordinate positions generated by the postprocessor. Only the machine x-z plane is currently available for circular interpolation. From the part programmer's viewpoint, the only restriction is that the tool be perpendicular to the plane of the circle. (ERA citation 08:024098)...Software Description: CDC CYBER174,175; FORTRAN IV (greater than 99%) and COMPASS (less than 1%); SCOPE 3.3; 37,000 (octal) words of memory are required.

ABCD; Atom-Triatom Nonreactive Collisions.
G. C. Schatz.
Northwestern Univ., Evanston, IL. Dept. of Chemistry. 1984, mag tape ANL/NESC-954 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048954 Price code: CP T09

ABCD integrates trajectories simulating nonreactive collisions between an atom and a triatomic molecule, and calculates quasiclassical integral and differential cross sections for vibra-

tionally inelastic scattering using a rotational sudden approximation. Both the intermolecular and the intramolecular potentials must be supplied. The intramolecular potential is assumed to be a quartic force field. Reactive or dissociative collisions are not properly described. Only processes for which the rotational sudden approximation is valid are appropriate. The molecule must be symmetric, but can be either linear or nonlinear. Final molecular eigenstates must have less than 10 quanta of excitation in each mode. (ERA citation 08:024511)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); 36,000 (octal) words of memory are required for execution on the CDC7600; 41,000 (octal) words are needed on the CDC CYBER175.

ABCRR;ABCRRJ; A+ BC Classical Trajectory Study.
L. D. Thomas.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-955 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048955 Price code: CP T11

ABCRR computes classical trajectories for rotationally inelastic collisions between an atom, A, and a diatomic molecule, BC, and for each trajectory stores initial and final trajectory data which can be used to compute differential, total differential, and integral cross sections. The program prints one line of information at the end of each trajectory and, optionally, prints data for intermediate points along the trajectory. ABCRRJ computes classical trajectories for A-BC collisions with fixed total angular momentum rather than fixed impact parameter. Data for each trajectory are stored which can be used to compute partial and integral cross sections. Classical partial cross sections for a fixed total angular momentum, J, can be computed, which facilitate a direct comparison of quantum and classical partial cross sections when the initial state is not the ground rotational state. (ERA citation 08:024512)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1 (CDC7600), NOS 1.3 (CDC CYBER175); Both ABCRR and ABCRRJ require less than 24,000 (octal) words of memory. The auxiliary programs, XRR and XRRJ, require 32,000 (octal) and 67,000 (octal) words of memory, respectively.

CONSEPT; Controller-Run Solvent Extraction.
A. P. Malinauskas, and A. D. Mitchell.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-956R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048956 Price code: CP T09

The program simulates the solvent extraction process used in the reprocessing of nuclear fuel, and, in particular, the actions of automatic process controllers in the solvent extraction system. The program can presently handle the Purex and Thorex processes, but the program can be modified easily to handle other solvent extraction processes. Maximum of 100 stages. (ERA citation 08:023110)...Software Description: IBM3033,360,370; FORTRAN IV (98%) and BAL (2%); OS/MVS or OS/MVT; The program requires 180K bytes of memory for execution.

PICES; Utility Static Generation Reliability.
S. R. Greene, and W. P. Poore, III.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-957 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048957 Price code: CP T11

PICES (Probabilistic Investigation of Capacity and Energy Shortages) was developed for estimating an electric utility's expected frequency and duration of capacity deficiencies on a daily on- and off-peak basis. In addition to the system loss-of-load probability (LOLP) and loss-of-load expectation (LOLE) indices, PICES calculates the expected frequency and duration of system capacity deficiencies and the probability, expectation, and expected frequency and duration of a range of system reserve margin states. Results are aggregated and printed on a weekly, monthly, or annual basis. The program employs hourly load data and either the two-state (on/off) or a more sophisticated three-state (on/partially on/fully off) generating unit representation. Unit maintenance schedules are determined on a weekly, levelized reserve margin basis. In addition to the 8760-hour annual load record, the user provides the following information for each unit: plant capacity, annual maintenance requirement, two- or three-state unit failure and repair rates, and for three-state models, the partial state capacity deficiency. PICES can also supply default failure and repair rate values, based on the Edison Electric Institute's 1979 'Report on Equipment Availability for the Ten-Year Period 1968 Through 1977', for many common plant types. Multi-year analysis can be performed by specifying as input data the annual peak load growth rates and plant addition and retirement schedules for each year in the study. Maxima of 1000 system reserve margin states, 301 generating units, 20 years of simulated operation, 5 generating units added or retired per year. Plant maintenance requirements must be specified as integer weeks, and generating units are represented by either two- or three-state models. Changes in load cycle shape are not accommodated within the code; the new year's load record is derived from multiplying the annual hourly load value by the annual growth factor. (ERA citation 08:023401)...Software Description: IBM303x,360,370; FORTRAN IV; OS/MVT or OS/MVS; 480K bytes of memory are required for execution.

STOPS; Power System Short-Term Optimization.
M. A. Kuliasha.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-958 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048958 Price code: CP T09

STOPS (Short-Term Optimization of Power Systems) is a unit commitment/economic dispatch model developed to determine how a power system with an active load control system should be operated to make the best use of its available resources. The model considers the generation mix, individual unit characteristics and constraints, production costs, system security requirements, the load profile, and the unique characteristics and operational limitations of the load control system. STOPS is capable of handling all types of conventional generating sources including thermal, hydroelectrical, and pumped storage units and most appliances for direct control including those with inherent or designed storage characteristics. In addition to the optimal load control operating strategy, hourly production costs, system marginal costs, spinning re-

serve, and fuel usage are calculated. The model does not attempt to determine the overall economics of load control systems, which must also include consideration of capital investments in generation, transmission, distribution, and load control facilities. However, it does calculate production cost savings and produce the modified system profiles necessary to determine capital investments. Each unit input must be available for the entire time period. STOPS can perform a weekly optimization using hourly loads for a power system of up to 60 generating units. (ERA citation 08:023402)...Software Description: IBM303x,360,370; FORTRAN IV; OS/MVT or OS/MVS; 280K bytes of memory are required for execution.

PUBG; Purex Solvent Extraction Process Model.
J. F. Geldard, A. L. Beyerlein, and L. R. Eyberger.
Clemson Univ., SC. Dept. of Chemistry and Geology. 1984, mag tape ANL/NESC-959 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048959 Price code: CP T09

PUBG is a chemical model of the Purex solvent extraction system, by which plutonium and uranium are recovered from spent nuclear fuel rods. The system comprises a number of mixer-settler banks. This discrete stage structure is the basis of the algorithms used in PUBG. The stages are connected to provide for countercurrent flow of the aqueous and organic phases. PUBG uses the common convention that has the aqueous phase enter at the lowest numbered stage and exit at the highest one; the organic phase flows oppositely. The volumes of the mixers are smaller than those of the settlers. The mixers generate a fine dispersion of one phase in the other. The high interfacial area is intended to provide for rapid mass transfer of the plutonium and uranium from one phase to the other. The separation of this dispersion back into the two phases occurs in the settlers. The species considered by PUBG are Hydrogen (1+), Plutonium (4+), Uranyl Oxide (2+), Plutonium (3+), Nitrate Anion, and reductant in the aqueous phase and Hydrogen (1+), Uranyl Oxide (2+), Plutonium (4+), and TBP (tri-n-butylphosphate) in the organic phase. The reductant used in the Purex process is either Uranium (4+) or HAN (hydroxylamine nitrate). Maximum of 100 mixer-settler stages. All feed streams enter the contactor through the mixers, with only one feed stream of each phase able to enter a mixe. All product streams exit the contactor from the settlers, with only one product stream of each phase able to exit a settler. (ERA citation 08:023111)...Software Description: IBM3033; CDC CYBER175; FORTRAN IV; OS/MVS or OS/MVT (IBM3033), NOS 1.3 (CDC CYBER175); The IBM3033 version requires 150K bytes of memory for execution; 62,000 (octal) words are required by the CDC CYBER175 version.

PRODCOST; Utility Generating Cost Simulation.
C. R. Hudson, II, T. M. Reynolds, and G. R. Smolen.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-960 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048960 Price code: CP T11

PRODCOST simulates the operation of an electric utility generation system. Through a probabilistic simulation the expected energy production, fuel consumption, and cost of operation for each unit in the system are determined. Total system fuel consumption, energy generation by type, total generation costs, as well as system loss of load probability and expected unserved energy are calculated. The code does not take into account the transmission and distribution system of the utility. It assumes that there are no transmission limitations within the system. Finite energy exchanges with neighboring utilities can be modeled. Maxima of 200 plants, 1 hydroelectric plant, 1 pumped storage plant, 5 separate firm purchases, 5 firm sales. (ERA citation 08:023403)...Software Description: IBM360,370,303x; FORTRAN IV (97%) and Assembler (3%); OS/370; 300K bytes of memory are required for execution.

PREMOR; Two-Group Point Reactor Power Plant Model.
D. R. Vondy.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-961 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048961 Price code: CP T13

PREMOR is a two-group point nuclear reactor power plant model for survey analysis. Critical core requirements and desired power level are satisfied by a direct iteration procedure which adjusts the actinide feed composition as needed. Either continuous or batch fueling may be modeled. Iteration may be accomplished to achieve an optimum fuel cost, or a series of succeeding problems solved to vary the neutron loss fraction. Results obtained include the neutron absorption distribution, nuclide concentrations, fuel cost and ore requirements, and integral information such as the fuel conversion ratio and doubling time, fuel consumption rate, effective neutron production per absorption and reactivity importance of the nuclides at selected points in the reactor history. The program has been used extensively for analysis of the graphite-moderated, gas-cooled reactor concept. Maxima of 13 actinides 11 fission products 1 lumped absorber 20 resident feed batches. (ERA citation 08:023540)...Software Description: IBM360,370,303x; FORTRAN IV (97%) and Assembler (3%); OS/360; 164 K bytes of memory are required for execution.

GASPAR; Evaluation of Atmospheric Releases.
K. F. Eckerman, D. G. Lash, and J. A. Shields.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-963 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048963 Price code: CP T11

GASPAR implements the air released dose models of the NRC Regulatory Guide 1.109 for noble gases (semi-infinite plume only) and the radioiodine and particulate emissions (specifically 1.109-10 through 1.109-13 and a portion of 1.109-14). GASPAR computes both population (ALARA-As Low As Reasonably Achievable and NEPA-National Environmental Policy Act) and individual doses. Site data, meteorological data, radionuclide release source terms, and location meteorological data for selected individuals are specified as input data. The site data include population data and milk, meat, and vegetation production. The meteorological data include dispersion X/Q, X/Q decayed, X/Q decayed and depleted, and deposition. Population doses, individual doses, and cost benefit tables are calculated. Maxima of 99 source terms 10 source terms in Cost Benefit Table 33 nuclides 5 individuals. (ERA citation 08:024248)...Software Description: IBM370,303x; FORTRAN IV (98%) and Assembly language (2%); OS/370; 270K bytes of memory are required for execution.

XOQDOQ; Nuclear Power Plant Effluent Releases.
J. Shields, J. T. Goll, and J. F. Sagendorf.
Nuclear Regulatory Commission, Washington, DC. Div. of Automatic Data Processing. 1984, mag tape ANL/NESC-964 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048964 Price code: CP T11

XOQDOQ was designed for meteorological evaluation of routine releases from commercial nuclear power reactors. It calculates average relative effluent concentrations and average relative deposition values at locations specified by the user and at standard radial distances and segments for downwind sectors. It also calculates these values at the specified locations for intermittent releases. Maxima of 30 receptor locations 14 velocity categories 7 stability categories 5 release exit points 5 receptor types. (ERA citation 08:023572)...Software Description: IBM370,303x; FORTRAN IV; OS1370; 240K bytes of memory are required to execute the sample problem.

BICYCLE; Levelized Life Cycle Cost Calculation.
R. W. Hardie.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-965 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048965 Price code: CP T09

BICYCLE calculates levelized life-cycle costs for plants that produce electricity, heat, gaseous fuels, or liquid fuels. BICYCLE also gives a detailed breakdown of the various life-cycle components making up the total and yearly cash flows in current dollars during each year of the project's lifetime. With current program dimensioning, 12(the number of years a plant operates)+ (the number of years for capital construction) must be less than 1000. (ERA citation 08:023404)...Software Description: CDC6600,CYBER175; FORTRAN IV; NOS 1.4 (CDC CYBER175); 23,000 (octal) words are required to execute the sample problems.

VIVAS2; A-BC Exact Coupled Channel Scattering.
G. A. Parker, J. C. Light, and J. V. Lill.
Oklahoma Univ., Norman. Dept. of Physics and Astronomy. 1984, mag tape ANL/NESC-966 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048966 Price code: CP T13

VIVAS2 computes the scattering S-matrix and transition probabilities for the collision of an S-state atom, A, with a sigma-state diatomic molecule, BC. Maxima of 600 quantum states for the system 300 rotational J values 150 channels to be integrated 50 oscillator basis functions 50 vibrational states. The S-matrix analysis assumes that there are no coulomb interactions. (ERA citation 08:024513)...Software Description: DEC VAX11/780; FORTRAN 77; VMS 2.4; 2.9 megabytes of memory are required to execute the sample problems.

SOFTWARE TOOLS; Program Development Interface.
D. K. Scherrer.
California Univ., Berkeley. Lawrence Berkeley Lab. 1984, mag tape ANL/NESC-967 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048967 Price code: CP T99

One of the problems encountered by computer users is the lack of common utility routines for different computer systems. The software which was initially presented in Kernighan and Plauger's SOFTWARE TOOLS represented a first step toward a solution to this problem. A common editor, text formatter, sort, and other program development tools were presented through two mechanisms: (a) all source was written in RATFOR, a FORTRAN preprocessor language directly translatable into FORTRAN, and (b) system-dependent routines were pushed down either into macro replacements or primitive function calls, to be implemented by the individual charged with bringing up the utilities in the local computing environment. These mechanisms, together with adoption of certain conventions pertaining to data types, permit many sites running different operating systems to implement these tools. If the shell, or command line interpreter, is implemented, this software can essentially define a portable "virtual operating system" providing inter-system uniformity at the three levels of user interface--virtual machine (the primitives), utilities, and command language. The SOFTWARE TOOLS package consists of a set of program development utilities and a program library modelled after the Bell Laboratories' proprietary UNIX operating system.Base version (This version is not tailored to any one machine but serves as a portable base for the user who can add "primitives" or modify the base source to tailor SOFTWARE TOOLS to the local computing environment.); FORTRAN IV and RATFOR. (ERA citation 08:025258)...Software Description: VAX 11/780; RATFOR, FORTRAN IV; MACRO-11 Assembly Language; Machine requirement is 22,000 blocks of disk storage.

SLIC; Interactive Graphics Three-Dimensional Mesh Generation.
M. A. Gerhard.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-968 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048968 Price code: CP T14

SLIC is an interactive graphics mesh generator developed for use with finite-element and finite-difference method application programs. The interactive graphics display coupled with mesh modification commands provides the user the ability to 'manipulate' the mesh and immediately view the result of this action. This capability facilitates the construction of complex models. Compressed data storage allows up to 32,762 points on the logical cube and a similar number on the actual mesh. Each logical point requires 1/4 word of small core memory (SCM), and each actual point retained requires four words of large core memory (LCM). SCM and LCM are dynamically allocated by the SLIC program. (ERA citation 08:025259)...Software Description: CDC7600; FORTRAN IV (99%) and COMPASS (1%); SLP (SLOPE); 102,000 (octal) words of small core memory and 400 (octal) words of large core memory are required to execute the sample problem.

RATEPAC; Power Plant Revenue Requirements Code.
L. C. Fuller.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-969 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch

tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048969 Price code: CP T11

RATEPAC models the financial aspects of an electric power plant or other investment requiring capital outlays and having annual operating expenses. The program produces incremental pro-forma financial statements showing how an investment will affect the overall financial statements of a business entity. The code accepts parameters required to determine capital investment and expense as a function of time and sums these to determine minimum revenue requirements (cost of service). The program also calculates present worth of revenue requirements and required return on rate base. RATEPAC is designed to provide a rapid means of estimating revenue requirements, cash flows, taxes, etc. It should be used only as an estimating tool for selection between alternatives or to justify more detailed studies. Simplifications have been made for speed of calculation and ease of use. Property tax is assumed to be constant over the plant lifetime. (ERA citation 08:023405)...Software Description: IBM303x,360,370; FORTRAN IV; OS/MVT or OS/MVS; 140K bytes of memory are required for execution.

DAP; Deuterium Depth Profile in Uniform Solids.
M. Marcuso, S. J. Rothman, L. Nowicki, and P. Baldo.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-970 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048970 Price code: CP T09

The Deuterium Analysis Program, DAP, is a tool for the analysis of data from nuclear reaction measurements which utilize the D(He-3,alpha)H reaction to determine deuterium concentration profiles in the near-surface region of solids. Maxima of 1024 channels for the experimental spectrum 50 depth divisions 10 radial divisions. (ERA citation 08:023993)...Software Description: IBM303x; FORTRAN IV; OS/MVS; 320K bytes of memory and auxiliary plotting devices are required.

ICOP; Financial Model Industrial Cogeneration.
L. M. Green, and H. F. Burnworth, Jr.
TRW Energy Engineering Div., McLean, VA. 1984, mag tape ANL/NESC-971 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048971 Price code: CP T09

The ICOP program performs financial analysis computations in a generic fashion, with special emphasis on the analysis of industrial cogeneration applications. Both undiscounted and discounted cash flows are generated. Measures of financial feasibility include energy savings, internal rate of return, and net present value. Maxima of 40 construction periods 40 years of operation. A variety of depreciation schemes can be defined, including those associated with the Economic Recovery Tax. (ERA citation 08:023406)...Software Description: CDC CYBER170,175; FORTRAN IV; MACE, the TRW-modified KRONOS Operating System (CDC CYBER170), NOS 1.4 (CDC CYBER175); Approximately 45,000 (octal) words of CDC CYBER175 memory are used to execute the program.

NJE; VAX-VMS IBM NJE Network Protocol Emulator.
D. E. Engert, and C. Raffenetti.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-972 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048972 Price code: CP T15

NJE is communications software developed to enable a VAX VMS system to participate as an end-node in a standard IBM network by emulating the Network Job Entry (NJE) protocol. NJE supports job networking for the operating systems used on most large IBM-compatible computers (e.g., VM/370, MVS with JES2 or JES3, SVS, MVT with ASP or HASP). Files received by the VAX can be printed or saved in user-selected disk files. Files sent to the network can be routed to any network node for printing, punching, or job submission, or to a VM/370 user's virtual reader. Files sent from the VAX are queued and transmitted asynchronously. No changes are required to the IBM software. Restrictions are related to functionality required of an end-node. The NJE protocol supports only those 'print' files with record sizes less than or equal to 133 bytes and 'punch' files with record sizes of 80 bytes. (ERA citation 08:025260)...Software Description: DEC VAX11/780; VAX-11 FORTRAN 77 (99%) and MACRO-11 (1%); VMS 2.5; VAX11/780 with Dump-11 UNIBUS interface and 9600 baud synchronous modem.

SWIFT; Waste-Isolation Flow and Transport Model.
R. M. Cranwell, and M. Reeves.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-973 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048973 Price code: CP T99

SWIFT solves the coupled or individual equations governing fluid flow, heat transport, brine displacement, and radionuclide displacement in geologic media. Fluid flow may be transient or steady-state. One, two, or three dimensions are available and transport of radionuclides chains is possible. SWIFT is designed to permit the user to adjust the machine requirements to problem complexity. On the CDC7600 in direct solution mode, the maximum number of grid blokcs allowed is approximately 1400. (ERA citation 08:023377)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1; 70,000 (octal) words of memory are required to compile the SWIFT source. 130,000 (octal) words of small core memory (SCM) and 400,000 (octal) words of large core memory (LCM) are needed to execute the sample problems.

NONSAP-C; Nonlinear Stress Concrete Structures.
C. A. Anderson, P. D. Smith, L. M. Carruthers, and C. Taylor.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-974 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048974 Price code: CP T15

NONSAP-C is a finite element program for determining the static and dynamic response of three-dimensional reinforced concrete structures. Long-term, or creep, behavior of concrete structures can also be analyzed. Nonlinear constitutive relations for concrete under short-term loads are incorporated in two time-independent models, a variable-modulus approach with orthotropic behavior induced in the concrete due to the development of different tangent moduli in different directions and an elastic-plastic model in which the concrete is assumed to be a continuous, isotropic, and linearly elastic-plastic strain-

hardening-fracture material. A viscoelastic constitutive model for long-term thermal creep of concrete is included. Three-dimensional finite elements available in NONSAP-C include a truss element, a multinode tendon element for prestressed and posttensioned concrete structures, an elastic-plastic membrane element to represent the behavior of cavity liners, and a general isoparametric element with a variable number of nodes for analysis of solids and thick shells An out-of-core equation solver for large systems of linear equations allows practically unlimited problem size. The truss and tendon elements are assumed to have constant area. The tendon element cannot be used in geometrically nonlinear analyses. The membrane element can have from 4 to 8 nodes and the general three-dimensional isoparametric element from 8 to 21. (ERA citation 08:024026)...Soft Description: CDC7600; FORTRAN IV (CDC FORTRAN Extended); LTSS (CDC7600), SCOPE 2.1.5 (CDC7600); Approximately 115K (octal) words of small core memory and 345K (octal) words of large core memory and 19 disk files are used by the program.

INGEN; Finite Element Program Mesh Generator.
W. A. Cook.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-975 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048975 Price code: CP T12

INGEN is a general-purpose mesh generator for use in conjunction with two- and three-dimensional finite element programs. The basic components of INGEN are surface and three-dimensional region generators that use linear-blending interpolation formulae. These generators are based on an i, j, k index scheme, which is used to number nodal points, construct elements, and develop displacement and traction boundary conditions. The origin cannot be used as the coordinated of a nodal point since the zero coordinates are a test used for nonexistent nodal points. To ensure a minimum bandwidth, label the index with the least number of nodal points I and the index with the most nodal points K. (ERA citation 08:025261)...Software Description: CDC7600; FORTRAN IV; SCOPE 2.1.5 (CDC7600); INGEN requires approximately 114,000 (octal) words of small core memory and 274K (octal) words of large core memory for CDC7600 execution.

GCFM5.0; Geothermal Field and Power Plant Costs.
J. C. Blake.
MITRE Corp., McLean, VA. METREK Div. 1984, mag tape ANL/NESC-976 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048976 Price code: CP T14

GCFM (Geothermal Loan Guaranty Cash Flow Model) is an interactive program which estimates project costs and cash flows for geothermal producer field projects and geothermal electric plant projects during construction and operation. Both the year-by-year cash flow for a project and a levelized busbar cost of electricity or a levelized price for geothermal fluid can be estimated. Maxima of 50 years project life (construction and operation), 50 years loan life, 15 financial cases, 10 power plant designs, 10 field designs. GCFM does not contain provisions for estimating the costs of geothermal direct heat utilization projects. (ERA citation 08:023378)...Software Description: IBM370,303x; FORTRAN IV; VM/CMS; 750K bytes of memory are required for execution of the program.

SECTION.REV1; Plot Geochemical Drill Hole Data.
C. Withrow.
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab. 1984, mag tape ANL/NESC-977 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048977 Price code: CP T09

SECTION, which consists of two interactive programs, SEC-IO and SEC-PLOT, provides plots of core sample geochemical data for any or all drill holes in a given area projected onto any predetermined section plane. Plot size is user-defined by keyboard input. Holes are plotted in cross section as straight lines defined by collar coordinates, bearing angle, dip angle, and length. SECTION is applicable to small problem areas with relatively short drill holes that are approximately straight. The data for one problem area may be saved and another retrieved, all within program control. Maxima of 700 samples in a problem area 805 records on the merge file 207 records on the data file. The program is limited to the straight-line model of a drill hole. (ERA citation 08:023379)...Software Description: UNIVAC1108,1100; FORTRAN V (99%) and Assembler (1%); EX EC8; SEC-IO and SEC-PLOT require 12,000 and 9,000 words of memory, respectively. SEC-IO requires a work file (unit 1) and a merge file (unit 2) on a direct access device. SEC-PLOT requires only the work file.

SLUMB.REV0; One-Dimensional Schlumberger Inversion Program.
T. Killpack, and S. Sandberg.
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab. 1984, mag tape ANL/NESC-978 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048978 Price code: CP T09

SLUMB accepts field data from a Schlumberger resistivity array and inverts it in terms of a one-dimensional layered geoelectrical model. Because the inverse problem is nonlinear, an initial guess model is required; this can be obtained by traditional curve matching or by repeated use of the forward algorithm. Unit 3 is used as an alternate print file. (ERA citation 08:023364)...Software Description: UNIVAC1108,1100; FORTRAN V (99%) and Assembler (1%); EXEC8; 22,000 words of memory are required for execution.

ASPEN; Advanced System for Process Engineering.
L. E. Graham.
Massachusetts Inst. of Tech., Cambridge. Energy Lab. 1984, mag tape ANL/NESC-979R U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048979 Price code: CP T99

ASPEN (Advanced System for Process Engineering) is a state-of-the-art process simulator and economic evaluation package which was designed for use in engineering fossil energy conversion processes. ASPEN can represent multiphase streams, including solids, and handle complex sub-

stances such as coal. The system can perform steady-state material and energy balances, determine equipment size and cost, and carry out preliminary economic evaluations. It is supported by a comprehensive physical property system for computation of major properties such as enthalpy, entropy, free energy, molar volume, equilibrium ratio, fugacity coefficient, viscosity, thermal conductivity, diffusion coefficient, and thermal conductivity for specified phase conditions - vapor, liquid, or solid. The properties may be computed for pure components, mixtures, or components in a mixture, as appropriate. The ASPEN Input Language is oriented towards process engineers. (ERA citation 08:022899)...Software Description: IBM303x; DEC VAX11/780; FORTRAN IV (99%) and Assembly language (1%) for the IBM CMS version. All of ASPEN except easily replaceable system utilities is written in ANS FORTRAN X3.9-1966. THE DEC VAX version is completely FORTRAN IV.; VM/CMS (IBM303x), VMS 2.4,2.5 (DEC VAX11/780); The IBM CMS transmittal tape is recorded at 6250 bpi. The IBM version CMS edition requires approximately 200 cylinders of IBM3350 or equivalent disk storage for the ASPEN system account, using three minidisks of 115, 30, and 35 cylinders, respectively, on an IBM3350 or equivalent disk drive and 2 megabytes of virtual storage. In addition, 5 cylinders of IBM3350 or equivalent disk storage and 2 megabytes of virtual storage are needed for each user account. The DEC VAX version requires approximately 3 megabytes of virtual storage in addition to approximately 150K blocks of disk storage for the system account, and 20K blocks of disk storage for each user account.

BENDPAC; Stress Analysis of Flanged Pipe Bends.
J. F. Whatham.
Australian Atomic Energy Commission, Sutherland. 1984, mag tape ANL/NESC-980 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048980 Price code: CP T13

BENDPAC is a package of seven programs designed to calculate the following: (a) stresses and deflections in pipe bends terminated by flanges, infinitely long tangent pipes, or short equal length flange-ended tangents when under pressure (PRESEF) or pure in-plane bending (BENDEF); (b) stresses in flange-ended pipe bends from in-plane end loading other than pure bending (SHEREF), coil spring type out-of-plane loading (COILEF), or any other type of out-of-plane loading (TURNEF); and (c) flexibility matrices for flange-ended pipe bends for any in-plane end loading (FLEXIN) or out-of-plane end loading (FLEXOT). Wall thickness should not exceed 0.3 of the pipe radius. All variables are expressed as truncated trigonometric series with a maximum of 16 terms. (ERA citation 08:024099)...Software Description: IBM303x,370; FORTRAN IV (93%) and Assembly language (7%); OS/MVS and OS/MVT; 380K bytes of memory are required to compile and execute the programs.

PLANMAP.REV1; Plots Geochemical Data in Plan.
C. Withrow.
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab. 1984, mag tape ANL/NESC-981 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048981 Price code: CP T09

PLANMAP, which consists of two interactive programs, PLAN-IO and PLAN-PLOT, is used to plot geochemical data in plan. Data are supplied by keyboard entry and can be listed, edited, and plotted. The input data consist of geochemical sample assay values and the coordinates that describe the locations of these samples. The output consists primarily of a plot that represents a map showing the data for one selected element or assay. The data may be modified in various ways, such as editing, adjusting assay value according to silicate content of sample, and mathematical function mapping. Various symbols may be selected to represent the sample locations on the plot. When producing the plot, the user interactively specifies parameters such as plot size, units, and scale factors. The data for one problem area may be saved and another retrieved, all under program control. Map section corner coordinates may be included as input data and either a keyboard or line printer listing of the data may be obtained, if desired. Maxima of 400 sample locations 194 elements or types of assays. The program has no map projection capabilities and is used to plot relatively small work areas where a flat earth approximation can be used. (ERA citation 08:023365)...Software Description: UNIVAC1108,1100; FORTRAN V (97%) and Assembly language (3%); EXEC8; 12,000 words of memory are required to execute PLAN-IO; RUNLP and PLAN-PLOT require 5,000 and 7,000 words, respectively. PLAN-IO requires a work file (unit 1) and a merge file (unit 2) on a direct-access file, RUNLP and PLAN-PLOT require the work file only.

DOECTZDATA; California Sixteen-Zone Weather Data.
C. Helmich.
California Energy Commission, Sacramento. Conservation Div. 1984, mag tape ANL/NESC-982 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048982 Price code: CP T99

DOECTZDATA is a collection of hourly weather data for each of 365 days in a year for sixteen different California thermal zones representing Eureka, Santa Rosa, San Francisco, Santa Cruz, Santa Barbara, Los Angeles, San Diego, Santa Ana, Pasadena, San Bernardino, Red Bluff, Sacramento, Fresno, Daggett, Brawley, and Tahoe. The data presented are in the form of the WBAN Hourly Surface Observation data used by the National Climatic Center, Asheville, North Carolina. They include the sky condition, visibility, weather and/or obstruction to vision information, sea level pressure, dew point temperature, wind direction and speed, station pressure, dry and wet bulb temperature, relative humidity, and cloud and obscuring phenomena information.IBM360; OS/360. (ERA citation 08:025223)

EGUN; Calculation of Electron Trajectories.
W. B. Herrmannsfeldt.
Stanford Linear Accelerator Center, CA. 1984, mag tape ANL/NESC-983 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048983 Price code: CP T11

EGUN, the SLAC Electron Trajectory Program, computes trajectories of charged particles in electrostatic and magnetostatic focusing systems including the effects of space charge and self-magnetic fields. Starting options include Child's Law conditions on cathodes of various shapes, user-specified ini-

tial conditions for each ray, and a combination of Child's Law conditions and user specifications. Either rectangular or cylindrically symmetric geometry may be used. Magnetic fields may be specified using arbitrary configuration of coils, or the output of a magnet program, such as Poisson, or by an externally calculated array of the axial fields. Maxima of 9001 mesh points in a square mesh 300 mesh points in the axial direction 100 mesh points in the radial direction 101 potentials 51 rays. In cylindrical coordinates, the magnetic fields are axially symmetric. In rectangular coordinates, any orientation of a two-dimensional magnetic field is possible. (ERA citation 08:024167)...Software Description: IBM370,303x,3081; FORTRAN IV (99%) and Assembler (1%); OS/MVS, OS/SVS, VM; 450K bytes of memory and two direct-access devices (logical units 1 and 8 are required).

PELSHIE2; Point Kernel Integration Shielding.
G. P. de Beer, A. E. Language, and J. I. Thompson.
Atomic Energy Board, Pelindaba, Pretoria (South Africa).
1984, mag tape ANL/NESC-984 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048984 Price code: CP T11

PELSHIE2 calculates dose rates from gamma-emitting sources with different source geometries and shielding configurations. Eight source geometries are provided and are called by means of geometry index numbers. Gamma-emmission characteristics of 133 isotopes, attenuation coefficients for 57 elements and other shielding materials, and Berger build-up parameters for 17 shielding materials can be obtained from two associated direct-access libraries. For extended sources, constant source strengths, as well as exponential and cosine or Bessel functions source strength distributions, are allowed in most cases. Maxima of 225 subregions per source 80 different photon energies per source 18 energy groups 10 different shielding regions. Only photons with an energy greater than 100 key can be handled by the program. Build-up below 250 keV is ignored. (ERA citation 08:024720)...Software Description: IBM360,303x; FORTRAN IV (99%) and BAL (1%); OS/MVT, OS/MVS; 140K and 60K bytes of memory are required by PELSHIE2 and the auxiliary program, respectively. Two direct-access devices (units 2 and 3) are used by both programs.

SPXCPL; Two-Dimensional Modeling of Self-Potential Effects.
W. R. Sill, and T. J. Killpack.
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab.
1984, mag tape ANL/NESC-985 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048985 Price code: CP T09

SPXCPL is a two-dimensional modeling program of self-potential effects from cross-coupled fluid and heat flow. The geological structure is two-dimensional, but the sources can be either finite line sources or point sources. The self potential (SP) method is based on the measurement of naturally occurring potential differences generated mainly by electrochemical, electrokinetic, and thermoelectric sources. The SP method of geophysical interpretation is used in geothermal exploration, earthquake-related phenomena, and in other engineering applications. The input model and solution are limited to two-dimensional geologic structures. The size of the mesh is fixed at 11 x 66 cells. (ERA citation 08:023366)...Software Description: PRIME400;DEC VAX11/780; FORTRAN IV; PRIMOS IV (PRIME400), VMS 3.0 (DEC VAX11/780); SPXCPL uses 8K words for program storage, 55K words of data, and 19K words of common data on the PRIME400 system, 160K bytes of vitrual storage are required on the VAX11/780.

ELLIPTIC; Elliptic Integrals by Duplication.
B. C. Carlson.
Ames Lab., IA. 1984, mag tape ANL/NESC-986 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048986 Price code: CP T09

ELLIPTIC is a set of four subroutines for numerically evaluating logarithms, arctangents, and elliptic integrals of all three kinds, including complete integrals. Two of the subroutines evaluate the incomplete elliptic integrals of the first and third kinds - RF(x,y,z) = 1/2 of the integral with respect to t from 0 to infinity of ((t+ x)(t+ y)(t+ z))**(-1/2), and RJ(x,y,z,p)= 3/2 of the integral with respect to t from 0 to infinity of ((t+ x)(t+ y)(t+ z))**(-1/2)/(t+ p). The integrals are complete if x= 0. The other two subroutines evaluate the special cases RC(x,y)= RF(x,y,y) and RD(x,y,z)= RJ(x,y,z,z). The function RD is an incomplete elliptic integral of the second kind, and RC embraces the logarithm, inverse circular functions, and inverse hyperbolic functions. These functions and others, such as Legendre's elliptic integrals and Heuman's lambda function can be expressed in terms of RC, RF, RD, and RJ (reference 1). (ERA citation 08:025262)...Software Description: NAS AS/6;IBM370 (designed to be machine-independent); FORTRAN IV; OS/MVT (IBM370); NESC used less than 50K bytes on an IBM370/195 for execution of the sample problems.

L2RMAT; Coupled Channel Inelastic Scattering.
R. B. Walker, and B. I. Schneider.
Los Alamos National Lab., NM. 1984, mag tape ANL/NESC-987 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048987 Price code: CP T11

L2RMAT solves the coupled, second-order differential equations of quantum inelastic scattering theory. The physical problem is defined by user-supplied subroutines, POT and LIST. The S-matrix analysis assumes there are no coulomb interactions. (ERA citation 08:024747)...Software Description: CDC7600,CYBER175; FORTRAN IV; SCOPE 2.1 (CDC 7600), NOS 1.4 (CDC CYBER175); 166,000 (octal) words of memory are required to execute the sample problem.

XERROR; Fortran Library Error-Handling Package.
R. E. Jones, and D. K. Kahaner.
Sandia National Labs., Albuquerque, NM. 1984, mag tape ANL/NESC-988 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048988 Price code: CP T09

XERROR is a collection of portable FORTRAN routines which serves as a central facility for processing error messages associated with errors occurring in libraries of FORTRAN rou-

tines. Two releases of XERROR are provided, one written in American National Standard X3.9-1966 FORTRAN and the other in American National Standard X3.9-1978 FORTRAN. The internal message table is normally set to a maximum length of 10 messages. (ERA citation 08:025263)...Software Description: CDC7600,6600,CYBER175 (designed to be machine-independent); FORTRAN 66 and FORTRAN 77; NOS 1.4 (CDC CYBER175); 26,000 (octal) words of memory are required to execute XERROR with the test programs provided.

LCLSQ1; Linear Least Squares with Constraints.
B. S. Garbow, K. E. Hillstrom, M. Minkoff, and R. L. Crane.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-989 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048989 Price code: CP T11

LCLSQ1 solves linear least-squares fitting problems with or without linear equality or inequality constraints. Specifically, given a matrix C with p rows and n columns (p .GE. n) and a p-dimensional vector d, LCLSQ1 finds the n-dimensional vector x which minimizes the sum of squares in the residual vector Cx-d. Further, this vector x can be required to satisfy m linear equality and/or inequality constraints, e.g., a(i)x .GE. b(i), where a(i) is an n-dimensional row vector of coefficients and b(i) is a scalar constant. The role of constraints is particularly useful in controlling the nature of x for linear data-fitting applications. (ERA citation 08:025264)...Software Description: IBM303x,360,370; FORTRAN; OS/MVT; LCLSQ1 compiles and executes the sample problem in less than 180K bytes. The GO step requires 168K.

IP2D.REV1; Resistivity and Induced-Polarization.
T. J. Killpack, and G. W. Hohmann.
Utah Univ. Research Inst., Salt Lake City. Earth Science Lab. 1984, mag tape ANL/NESC-990 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048990 Price code: CP T12

IP2D is an interactive IP-resistivity modeling system designed to model arbitrary two-dimensional IP-resistivity structures for comparison with data from dipole-dipole surveys. The system is made up of a group of nine main programs chained together. Two of these are batch-mode oriented. Control is passed between the programs by means of a system routine. Maxima of 100 models stored on the merge file 78 x-elements in the mesh 20 z-elements in the mesh 6 dipole separations. IP2D is set up to use 17 electrode positions for the transmitting and receiving electrodes. The work file (unit 1) is used to hold the data for a single model and computed results. A merge file (unit 2) is used to store copies of the work file. (ERA citation 08:023367)...Software Description: UNIVAC1108,1100; FORTRAN V (99%) and Assembler (1%); EXEC8. The largest of the nine programs requires 58,000 words of memory. IP2D uses two random access data files.

FCHART/SLR2.0; Solar Heating System Performance.
D. Chan, and L. R. Eyberger.
Northeast Solar Energy Center, Boston, MA. 1984, mag tape ANL/NESC-991 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048991 Price code: CP T11

FCHART/SLR is a tool that solar designers can use to predict the thermal and economic performance of solar heating systems. FCHART/SLR can analyze the performance of three general types of solar systems: active flat plate collector systems of standard configuration used for space and water heating, passive systems consisting of up to nine passive subsystems, or a combination of active and passive systems. The types of passive subsystems considered are: trombe wall, water wall, direct gain, and sunspace. FCHART/SLR can analyze the effect of each subsystem individually, as well as predict the performance of the composite system. As well as having a choice of the type of solar system to be analyzed, the user has a choice of the type of analysis to be performed: thermal analysis, economic analysis, or both thermal and economic analysis. The economic analysis is based on standard life-cycle cost procedures. Maxima of 266 cities for which data is present in weather library 9 passive subsystems. Performance of systems with heat pumps, absorption air conditioners, seasonal storage capacity, desiccant coolers, high minimum useable temperature requirements, etc. cannot be adequately estimated. The system load must be for space heating and/or water heating or must be similar to these with regard to minimum useable temperature and load distribution. The procedure for handling combined systems has not been validated. Because diurnal interaction between the two systems has not been taken in account, the performance analysis of a space heating system with both active and passive components should be considered as only an approximation. (ERA citation 08:023311)...Software Description: DEC20;DEC VAX11/780; FORTRAN 77; VMS 3.0 (DEC VAX11/780): The DEC20 version requires approximately 100K words of memory for execution; the VAX11/780 version requires 135,000 bytes of memory.

LADTAP2; Liquid Pathway Dose Calculations.
J. A. Shields, J. S. Bland, K. F. Eckerman, and S. Acharya.
Nuclear Regulatory Commission, Washington, DC. 1984, mag tape ANL/NESC-992 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048992 Price code: CP T11

LADTAP2 determines the radiation dose to man from the pathways in the aquatic environment - potable water, aquatic foods, shoreline deposits, swimming, boating, and irrigated foods. Doses for both the maximum individual and the general population are calculated as a function of age group and pathway for appropriate body organs. Calculation of doses to certain species of biota other than man, such as fish, invertebrates, algae, muskrat, raccoon, heron, and duck implementing the models of WASH-1258 is possible, also. Maxima of 200 nuclides in the release source term 20 sport fish harvest locations 20 commercial fish harvest locations 20 sport invertebrate harvest locations 20 commercial invertebrate harvest locations. (ERA citation 08:024293)...Software Description: IBM360,370,303x;CDC7600,CYBER175; FORTRAN IV; OS/MVT (IBM360), NOS 1.4 (CDC CYBER175); 260K bytes of memory are required by the IBM360 version; the CDC7600 version requires 143,000 (octal) words of memory. Both versions require that the companion dose factor library be equivalenced to FORTRAN logical unit 10.

CLAP; Linear Control System Design Analysis.

A. S. Maddux, Jr.
Lawrence Livermore National Lab., CA. 1984, mag tape ANL/NESC-995 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83048995 Price code: CP T03

CLAP is a system of programs developed as a tool for the engineer to use in the design and analysis of linear controls for electronic or mechanical systems. Programs are included to calculate and plot system response time and gain and phase versus frequency, to calculate the roots of Nth-order polynomials, and to generate root locus plots as a function of loop gain. Bandwidth limitations, overshoot, ringing and other instabilities can be observed and corrected. Data files can be modified and merged. Characteristics and parameters of a system can be analyzed, then modified with a computer model of a compensator 'installed' in the feedback loop. The floating point accuracy of the computer limits the order of the transfer function polynomials to 15. (ERA citation 08:024100)...Software Description: Commodore PET with IEEE 488 Bus interface and perphipherals; BASIC; Commodore PET 2001-32N, IEEE 488 Bus, digitizing joy stick, Watanabe WX4671 Plotter, CBM 2040 Floppy Disk and 2022 Printer, and ECX Computer MX-200 modem.

ARC-DIF1D; One-Dimensional Multigroup Diffusion and Inventory.
D. E. Neal, G. K. Leaf, A. S. Kennedy, and B. J. Toppel.
Argonne National Lab., IL. 1984, mag tape ANL/NESC-626 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
DE83948626 Price code: CP T16

The ARC 1D-diffusion capability provides complete one-dimensional solutions of the multigroup diffusion equations with edits and a neutron inventory on option. (ERA citation 08:028672)...Software Description: IBM360; FORTRAN IV; OS/360; 260K bytes of core and at least 2 peripheral I/O devices for scratch files in addition to files for the load module library and cross section data.

RAFFLE; First Flight Collision Probabilities for Multiple-Cell Geometries.
O. W. Hermann, and R. S. Carlsmith.
Oak Ridge National Lab., TN. 1984, mag tape ANL/NESC-392 U.S. Sales Only. Price includes documentation. Tapes can be prepared in most recording modes for one-half inch tape. Specify recording mode desired. Call NTIS Computer Products if you have questions.
XE83048392 Price code: CP T11

RAFFLE calculates neutron first-flight collision probabilities for a wide variety of three-dimensional cell geometry configurations. The outer boundaries of the cell cross section may be circular, square, or hexagonal. The cell may contain annular regions and/or clusters of rods. Maxima of 20 regions, 10 different types of rods (differing in either geometry or materials), 50 rods per region, 20 subregions per rod, 12 regions with rods (only the first 12 regions counting from the cell center), 8 materials. (ERA citation 08:020517)...Software Description: IBM360,370/195; FORTRAN IV and BAL; OS/360,370.

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DE83048777 96 CP **T03**

DOS; Neutron Flux-Dosimeter Activity Relation.
DE83048423 33 CP **T03**

PESTS; Thermo-Hydraulic System Data Analysis.
DE83048914 125 CP **T03**

SIEX; LMFBR Fuel Pin Thermal Performance Model.
DE83048673 76 CP **T09**

GASKET; Thermal Scattering Law Calculation.
DE83048263 10 CP **T09**

NASA; MHD-Modified Chemical Equilibrium Code.
DE83048934 130 CP **T12**

LOCK; Few-Channel Coolant-Flow Blockage Study.
DE83048732 88 CP **T11**

ISOSEARCH; Isotope Production Flux, Cross Section Calculations.
DE83048322 18 CP **T09**

L2RMAT; Coupled Channel Inelastic Scattering.
DE83048987 140 CP **T11**

COMPARE; Transient Flow in Vented Fluid System.
DE83048702 82 CP **T09**

SAS1A; Fast Reactor Power and Flow Transients.
DE83048400 30 CP **T13**

PL-MOD; Fault Tree Analysis by Modularization.
DE83048897 122 CP **T11**

MESA; Maximum Entropy Time Series Analysis.
DE83048825 106 CP **T11**

SEALSHELL2;M0110; Shell Stress Analysis for Axisymmetric Loading.
DE83048282 12 CP **T11**

ADVCON; Advance Control 93 APT Postprocessor.
DE83048950 133 CP **T11**

PLENUM; Flow Distribution in Cylindrical Coolant Inlet Plenum.
DE83048586 62 CP **T09**

TOAD; Processing of Analyzer gamma-Ray Spectra.
DE83048333 20 CP **T11**

GASPAR; Evaluation of Atmospheric Releases.
DE83048963 135 CP **T11**

SOMIX1; Sodium Spray Fires in Cylindrical Cell.
DE83048751 91 CP **T11**

ETOX3; Multigroup Constants from ENDF/B for One Dimension.
DE83048388 28 CP **T13**

LASO; Block Lanczos Symmetric Eigenvalue Code.
DE83048918 126 CP **T13**

ACCEL/MOD2; Design of Printed-Circuit Boards.
DE83048681 78 CP **T18**

SAFE-AXISYM; Stress Analysis of Axisymmetric Load.
DE83048251 8 CP **T11**

LCURVE; Learning Curve Production Calculations.
DE83048936 130 CP **T03**

RICE-LASL; Chemically Reactive Mixture Flow.
DE83048720 86 CP **T11**

LION4;LION; Three-Dimensional Temperature Distribution Program.
DE83048299 15 CP **T11**

BENDPAC; Stress Analysis of Flanged Pipe Bends.
DE83048980 139 CP **T13**

HAMOC; Fluid Hammer Analysis of Piping System.
DE83048710 84 CP **T11**

GLUB1; Water-Logged Fuel Element Analysis.
DE83048424 33 CP **T11**

DESA; District Energy System Cost Energy Model.
DE83048911 125 CP **T13**

GEOCITY; Geothermal District Heating Economics.
DE83048835 108 CP **T14**

WATER; Steam Tables at 14.5 to 14,500 Psia and 32 to 472 exp 0 F.
DE83048267 10 CP **T09**

TDELAY; Scattering Phase Shifts and Time Delays.
DE83048928 128 CP **T09**

PELEN; Fuel Pellet Temperature and Deformation.
DE83048598 64 CP **T12**

FEVER7; One-Dimensional Multigroup Diffusion and Depletion.
DE83048318 18 CP **T12**

SLIC; Interactive Graphics Three-Dimensional Mesh Generation.
DE83048968 136 CP **T14**

FRANTIC-NRC; Time-Dependent System Unavailability.
DE83048766 94 CP **T09**

SABOR4; Discrete-Element Analysis of Thin Shells.
DE83048402 30 CP **T12**

SHAFT79; Two-Phase Geothermal Reservoir Model.
DE83048893 121 CP **T16**

MOCUS; Minimal Sets from Fault Trees.
DE83048653 73 CP **T11**

AVOID; Annular Void Cross Section Calculation.
DE83048276 12 CP **T03**

BECOM-BNL; Buildings Energy Optimization Model.
DE83048949 132 CP **T13**

EURCYL1; Cylinder-Cylinder Intersection Mesh Generator.
DE83048746 90 CP **T09**

SAFE-3D; Three-Dimensional Composite Structure Stress Study.
DE83048332 20 CP **T12**

PLANMAP.REV1; Plots Geochemical Data in Plan.
DE83048981 139 CP **T09**

FRAPCON2;FRAP-S3;FRAP-S1; Steady State Analysis Oxide Fuel Rods.
DE83048694 80 CP **T16**

STINT3; Single-Channel Space-Time Synthesis.
DE83048389 28 CP **T09**

RELAP5/MOD1/018; LWR Loss of Coolant Analysis.
DE83048917 126 CP **T18**

PROMSYS; Programmed Equipment Maintenance.
DE83048846 110 CP **T12**

REAX; Resolved Resonance Epithermal Cross Sectionss.
DE83048257 9 CP **T09**

ORTEP2; Crystal Structure Illustration Plots.
DE83048938 131 CP **T12**

MONA; One-Dimensional Multigroup Diffusion in Slab, Cylindrical, and Spherical Geometry.
DE83048582 61 CP **T14**

FREVAP6; HTGR Metallic Fission Product Release.
DE83048301 15 CP **T09**

VIVAS2; A-BC Exact Coupled Channel Scattering.
DE83048966 136 CP **T13**

COMPARE/MOD1A; Transient Flow with Sinks and Doors.
DE83048776 96 CP **T12**

MICHRD; Microhardness Measurement Analysis.
DE83048421 33 CP **T09**

SOLCOST3.0; Solar Heating and Cooling Design.
DE83048907 124 CP **T15**

HONDO; A Dynamic Response Finite-Element Code.
DE83048672 76 CP **T11**

FIGRO; LWBR Fuel Swelling Temperature Study.
DE83048272 11 CP **T11**

SPIRT; Stress-Strains from Transient Pressures.
DE83048927 128 CP **T13**

RELAP3B/MOD110; Reactor System Transient Code.
DE83048733 88 CP **T15**

2DB; Two-Dimensional Multigroup Diffusion and Depletion.
DE83048325 19 CP **T11**

ASPEN; Advanced System for Process Engineering.
DE83048979 138 CP **T99**

CREEP-PLAST; Two-Dimensional Inelastic Structural Analysis.
DE83048707 83 CP **T13**

SUMOR;M0271; S-Wave Neutron Cross Section Calculation.
DE83048399 30 CP **T09**

RAS; Reliability Analysis for Phased Missions.
DE83048889 120 CP **T14**

STESEP; Solar Total Energy System Evaluation.
DE83048821 105 CP **T09**

WIGL2; One-Dimensional, Two-Group Space-Time Diffusion.
DE83048274 11 CP **T12**

ABCD; Atom-Triatom Nonreactive Collisions.
DE83048954 133 CP **T09**

SPEAKEASY MU+ Level; Language Processor Tso or Batch.
DE83048593 63 CP **T99**

M0457;PIPE; Elastic Stress of Piping System.
DE83048329 19 CP **T11**

BICYCLE; Levelized Life Cycle Cost Calculation.
DE83048965 136 CP **T09**

CORTES; Thermal and Mechanical Analysis of Tees.
DE83048759 92 CP **T15**

SORSDB; Pressure Vessel Stress and Fatigue.
DE83048391 29 CP **T03**

DEVOG; Coupled Molecular Scattering Equations.
DE83048920 127 CP **T11**

MARGE/SLUMP; Maximum Temperature LMFBR Fuel Pin.
DE83048677 77 CP **T09**

EXPN; Analysis of Pulsed Neutron Source Data.
DE83048258 9 CP **T09**

SATDSK; Saturated Iron Magnetic Field Study.
DE83048944 131 CP **T09**

NATRAN2; Fluid Hammer Analysis One-Dimensional and Two-Dimensional Systems.
DE83048719 85 CP **T11**

GRDWRK; Grid Generation for Safe Programs.
DE83048296 14 CP **T09**

SLUMB.REV0; One-Dimensional Schlumberger Inversion Program.
DE83048978 138 CP **T09**

SPRAY3; Sodium Spray Release Safety Analysis.
DE83048716 85 CP **T09**

CHAINS; Analysis of Radioactive Decay Chains.
DE83048418 33 CP **T03**

CHECKER;CRECT;STNDRD;FIZCON; PSYCHE;RESEND;INTER;INTEND;SUMRIZ;PLOTEF;LSTFO[illegible]B327 ENDF/B V5 Processing Codes.
DE83048915 125 CP **T16**

SOLA-DF; Transient Two-Dimensional Two-Phase Flow.
DE83048832 107 CP **T09**

RSAC; Radiological Safety Analysis Program.
DE83048265 10 CP **T12**

IDAP: Interactive Decision Analysis Procedure.
DE83048935 130 CP **T15**

GAUSS5; Analysis of gamma-Ray Spectra Ge(Li).
DE83048605 65 CP **T14**

GAPOTKIN; Space-Independent Reactor Kinetics.
DE83048317 18 CP **T09**

SWIFT; Waste-Isolation Flow and Transport Model.
DE83048973 137 CP **T99**

ZONE; Two-Dimensional Finite Element Mesh Generator.
DE83048765 94 CP **T11**

BE21; Few-Group, Discrete Ordinates for Slab Geometry.
DE83048398 30 CP **T11**

OCTAVIA; Pressure Vessel Failure Probabilities.
DE83048898 122 CP **T09**

XDTRAP; Hydrogen Permeation with Trapping.
DE83048655 73 CP **T09**

M0552; Dynamic Analysis of Linear Elastic Systems.
DE83048283 13 CP **T09**

SOLA-VOF; Transient Fluid Flow Free Boundaries.
DE83048948 132 CP **T11**

CORRAL2; Radionuclide Containment after LOCA.
DE83048745 90 CP **T11**

STEM; Matrix Generation for a System of BEAMS.
DE83048337 20 CP **T03**

DOECTZDATA; California Sixteen-Zone Weather Data.
DE83048982 139 CP **T99**

ENERGY; LMFBR Coolant Temperature Prediction.
DE83048696 81 CP **T11**

COHBE;PREP; Coherent Inelastic Scattering Law Calculations.
DE83048385 28 CP **T03**

PABLM; Accumulated Environment Radiation Dose.
DE83048926 128 CP **T12**

PASOLE; Simulation of Passive Solar Systems.
DE83048850 111 CP **T11**

LASER; Spectrum Calculations with Burnup in Cylindrical Lattices.
DE83048249 8 CP **T14**

ABCRR;ABCRRJ; A+ BC Classical Trajectory Study.
DE83048955 134 CP **T11**

ASTEM; Thermodynamic Properties Water and Steam.
DE83048580 61 CP **T09**

M0899;HOH; Steam Tables 14.5-2538 Psia.
DE83048294 14 CP **T09**

INGEN; Finite Element Program Mesh Generator.
DE83048975 138 CP **T12**

DSNP; Dynamic Simulation Nuclear Power Plants.
DE83048784 98 CP **T16**

PARTI; Optimal Group or Mesh Collapsing.
DE83048416 33 CP **T03**

DSTRESS; Transient Fuel Model for Clad Strain.
DE83048906 123 CP **T11**

RCPL1; Prepares RCP01 Cross Section Libraries.
DE83048671 76 CP **T14**

CAESAR4; LIBLST; One-Dimensional, Multigroup Diffusion.
DE83048270 10 CP **T15**

PICES; Utility Static Generation Reliability.
DE83048957 134 CP **T11**

K-FIX; Transient Two-Dimensional Two-Phase Flow.
DE83048727 87 CP **T11**

EXPALS; Least Squares Exponential Decay Curves.
DE83048321 18 CP **T09**

NONSAP-C; Nonlinear Stress Concrete Structures.
DE83048974 137 CP **T15**

ORCENT2; Nuclear Steam Turbine Cycle Analysis.
DE83048703 82 CP **T12**

GAPL3; Inelastic Large Deflection Stress Study.
DE83048397 30 CP **T11**

ANGCOR; Directional Correlation Coefficients.
DE83048899 122 CP **T09**

SWAP9; Stress-Wave Analysis in One-Dimensional Strain.
DE83048828 106 CP **T11**

M0807; Two-Dimensional Diffusion Absorption Removal Cross Sections.
DE83048280 12 CP **T09**

CONSEPT; Controller-Run Solvent Extraction.
DE83048956 134 CP **T09**

MAPPER-GEPI; Predicting Equipment Requirements.
DE83048595 63 CP **T03**

DAFT1; Least Squares Fit for Fissile Nuclide Data.
DE83048327 19 CP **T03**

SECTION.REV1; Plot Geochemical Drill Hole Data.
DE83048977 138 CP **T09**

TIMEX; One-Dimensional Time-Dependent Multigroup Discrete Ordinates.
DE83048756 92 CP **T12**

CITATION; One-, Two-, and Three-Dimensional Diffusion Depletion Using Multigroup Theory.
DE83048387 28 CP **T16**

SUPERENERGY2; Steady-State LMFBR Core Analysis.
DE83048904 123 CP **T13**

GNATS;MESH2;GPRINT; Two-Dimensional Nonlinear Analysis.
DE83048682 78 CP **T14**

MANTA; Steady-State Thermal-Hydraulic Analysis.
DE83048256 9 CP **T12**

PRODCOST; Utility Generating Cost Simulation.
DE83048960 135 CP **T11**

NATRANSIENT; Fluid Hammer Analysis One-Dimensional Piping.
DE83048718 85 CP **T09**

GGC4; Multigroup Cross Sections Fast Thermal Spectra.
DE83048298 15 CP **T15**

EGUN; Calculation of Electron Trajectories.
DE83048983 139 CP **T11**

SPOOL-FIRE; Spray-Pool Burning of Sodium.
DE83048714 84 CP **T09**

REDUX; Reactor Fluctuation Experiment Analysis.
DE83048425 34 CP **T03**

QLN1; Quantitative gamma-Ray Spectra Analysis.
DE83048902 123 CP **T13**

OPTIMIZERS; Nonlinear Optimization Subroutines.
DE83048829 107 CP **T13**

CYGRO2; Stress Analysis of Cylindrical Fuel Elements.
DE83048266 10 CP **T11**

PUBG; Purex Solvent Extraction Process Model.
DE83048959 135 CP **T09**

TCB01; Creep-Buckling of Tubes under Pressure.
DE83048604 65 CP **T09**

AIROS2A; Simulation of Reactor Dynamics.
DE83048326 19 CP **T12**

APARNA2; One-Dimensional Integral Neutron Transport in Slab Geometries.
DE83048878 117 CP **T03**

BEHAVE-SST; Overpower Transient Fuel Mechanics.
DE83048768 95 CP **T15**

FINEL; Finite-Element Study in Two- and Three-Dimensonal Structures.
DE83048404 31 CP **T09**

COLCO; Thermal Diffusion Column Coefficients.
DE83048903 123 CP **T09**

ELBOW-ORNL; Pipe Stress and Flexibility Calculations.
DE83048650 73 CP **T09**

M0555;ACT1; Loss-of-Coolant Accident Analysis.
DE83048284 13 CP **T11**

STOPS; Power System Short-Term Optimization.
DE83048958 134 CP **T09**

PARK1; Nuclear Reactor Power Plant Analysis.
DE83048743 90 CP **T17**

NURLOC-1.0; Loss-of-Coolant Thermal Analysis.
DE83048328 19 CP **T11**

EQ3/6; Chemical Equilibrium of Aqueous Systems.
DE83048886 119 CP **T15**

MELT3; Fast Reactor Transient Overpower Study.
DE83048700 81 CP **T14**

JITER; Fluctuation Experiment Analysis.
DE83048394 29 CP **T09**

SALE2D; General Transient Fluid Flow Algorithm.
DE83048900 122 CP **T12**

SURGTANK; Reactor Steam Surge Tank Dynamics.
DE83048853 112 CP **T11**

MUSCAT; View Factor Shielding Code Cavity Geometry.
DE83048259 9 CP **T11**

PREMOR; Two-Group Point Reactor Power Plant Model.
DE83048961 135 CP **T13**

TRIAL; Three-Dimensional Reaction Rates from Two-Dimensional Flux Sets.
DE83048585 62 CP **T09**

GAFFE; Equilibrium Fuel Cycle Calculation.
DE83048302 16 CP **T11**

PECS3; Probabilistic Evaluation Cladding Life.
DE83048868 115 CP **T11**

IMPORTANCE; FTA Basic Event and Cut Set Ranking.
DE83048779 97 CP **T09**

ATHENA4; Inelastic Scattering Form Factors.
DE83048417 33 CP **T11**

GWCORE; GSPC 79 Core Graphics Routines Package.
DE83048905 123 CP **T18**

BUCKLE; Creep Buckling of Initially Oval Tube.
DE83048667 75 CP **T03**

MACH1; One-Dimensional, Multigroup Diffusion in Slabs, Cylinders, and Spheres.
DE83048262 9 CP **T15**

K-FIX;3D; Three-Dimensional Extension Two-Phase Flow Dynamics.
DE83048877 117 CP **T15**

PLACRE; FEM Inelastic Structural Analysis.
DE83048740 89 CP **T13**

TEMCO7; Temperature Coefficient Calculation.
DE83048320 18 CP **T12**

PAD; One-Dimensional Coupled SN Neutronics and Hydrodynamics.
DE83048901 122 CP **T16**

EPISODEB; Solve Ordinary Differential Equations Systems with Banded Jacobian.
DE83048705 83 CP **T11**

WASP2; Water Properties for Safety Analysis.
DE83048396 29 CP **T12**

SWAAM1; LMFBR Sodium-Water Reaction Analysis.
DE83048885 119 CP **T15**

COMPUTER CODES

PHOS1; pH and Conductivity of Sodium Phosphate Solutions.
DE83048826 106 CP **T03**

PDQ8;PDQ7; One-, Two-, or Three-Dimensional, Few Group Diffusion Depletion.
DE83048275 11 CP **T99**

INTEROP; Nonlinear Optimization Algorithms.
DE83048866 115 CP **T12**

ORCOST2; Power Plant Capital Cost Estimating.
DE83048588 62 CP **T11**

TWIGL;TWIGGLE; Two-Dimensional, Two-Group Space-Time Diffusion Feedback.
DE83048338 20 CP **T09**

CATCH; Map Projection Subroutine Package.
DE83048872 116 CP **T11**

GRFPAK; Plot Package for CORTES FEM Programs.
DE83048760 93 CP **T13**

CHECKER;CRECT;DAMMET;PLOTFB; SLAVE3 ENDF/B V1 Processing Codes.
DE83048384 27 CP **T14**

NJOY; Neutron and Photon Cross Sections from ENDF/B.
DE83048883 118 CP **T99**

DEMO4; CRBR Reactor and Plant Transient Analysis.
DE83048676 77 CP **T13**

R101; Space-Independent Kinetics Kex Options.
DE83048255 8 CP **T03**

WHIP1; Structural Deflection Due to Blowdown.
DE83048863 114 CP **T03**

SOLA-ICE; Transient Compressible Fluid Flow.
DE83048723 86 CP **T03**

FLASH3; Loss-of-Coolant Accident Analysis.
DE83048295 14 CP **T13**

SAMPLE; Monte Carlo Uncertainty Analysis Code.
DE83048879 117 CP **T03**

WREM-TOODEE2/MOD3; Two-Dimensional Time-Dependent Fuel Element Study.
DE83048712 84 CP **T14**

MANE1; Rectangular Magnetic Network Solution.
DE83048412 32 CP **T09**

MINPACK1; Nonlinear Equations and Least Squares.
DE83048888 120 CP **T16**

TRAC-PD2/MOD1; Best-Estimate Analysis PWR LOCA.
DE83048836 108 CP **T99**

THREDES; One-Dimensional Few Group Diffusion Design System.
DE83048273 11 CP **T14**

THERPP; Thermodynamic Properties of Hydrocarbons.
DE83048869 115 CP **T09**

LENSDES; Nonlinear Least Squares Lens Design System.
DE83048602 64 CP **T11**

GASP7; One-Dimensional Burnup Power Distribution Search.
DE83048319 18 CP **T12**

ICARUS; Redundant System Unavailability Model.
DE83048871 116 CP **T09**

SOERP; Second-Order Error Propagation Code.
DE83048764 94 CP **T03**

FLAC; Steady-State Flow, Pressure Distribution.
DE83048395 29 CP **T09**

GETOUT; Radionuclide Transport Geologic Media.
DE83048887 119 CP **T12**

LUGS; Stress for Integral Attachments to Pipe.
DE83048648 72 CP **T03**

WHAM6; Liquid-Filled Piping System Analysis.
DE83048278 12 CP **T09**

PELE-IC; Fluid-Structure Interaction Analysis.
DE83048865 114 CP **T15**

CURT2; Curved Tubes or Elbows and Attached Pipes.
DE83048750 91 CP **T13**

M0219;FLOT1; PWR Flow Transient Analysis.
DE83048331 20 CP **T11**

TSOAK-M1; Analysis of Fusion Detritiation Data.
DE83048875 117 CP **T12**

NMMSS; Nuclear Materials Management System.
DE83048695 80 CP **T13**

M0661;M0657;M0626; Polynomial Curve Fitting.
DE83048411 32 CP **T11**

GSMP; General Systems Analysis Modeling Code.
DE83048882 118 CP **T14**

DENDRO; Hierarchical Cluster Analysis of Data.
DE83048840 109 CP **T11**

SAFE-SHELL; Stress Analysis of Thin Shells.
DE83048253 8 CP **T09**

SOLA-LOOP; Two-Phase Flow Network Analysis.
DE83048859 113 CP **T11**

DWARF; One-Dimensional Few-Group Diffusion Depletion Program.
DE83048579 61 CP **T14**

BURNUP; Heavy Element Isotopic Burnup Analysis.
DE83048311 17 CP **T12**

ACSAP; Resonance Region Cross Section Analysis.
DE83048880 118 CP **T12**

SPEKEN; Pearson, Spearman and Kendall Correlation.
DE83048781 97 CP **T09**

NOAH; One-Dimensional, One-Group Space-Time Diffusion Feedback.
DE83048405 31 CP **T11**

VUGRAPH; Plots Presentation-Quality Viewgraphs.
DE83048884 119 CP **T03**

SAFTAC; Monte Carlo Fault Tree Simulation Code.
DE83048674 76 CP **T09**

HEXSCAT; Elastic Scattering Cross Sections Hexagonal Lattices.
DE83048291 14 CP **T03**

PDFPLOT; Statistical Distribution Functions.
DE83048860 113 CP **T12**

DIFFUSER; Two-Dimensional Subsonic MHD Diffuser Performance.
DE83048737 88 CP **T09**

HWOCR-SAFE; Two-Dimensional Monte Carlo Cell Calculation.
DE83048307 16 CP **T12**

SANDIA-ORIGEN; Isotope Generation and Depletion.
DE83048874 117 CP **T13**

BEAMCRP; Finite-Element Beam Creep Analysis.
DE83048701 82 CP **T11**

DATATRAN2 Utility Plotting Modules; Utility Plot Modules F(X) and F(X,Y).
DE83048407 31 CP **T12**

FESH; X-Y Multi-Group Neutron Transport Method.
DE83048861 114 CP **T11**

UDAD; Uranium Dispersion and Dosimetry Model.
DE83048824 106 CP **T12**

HAMMER;LITHE;HELP; Critical Analysis System.
DE83048277 12 CP **T15**

BNWIGL;UNIWIGL; Two-Group Time-Dependent, One-Dimensional Diffusion.
DE83048870 115 CP **T15**

INTEG;INSPEC; Markov Simulation of Reactor Operations.
DE83048590 62 CP **T03**

CINDER;M0102; Point Depletion Fission Product.
DE83048313 17 CP **T11**

REFCO8; Discounted Cash Flow Fuel Cycle Cost.
DE83048855 112 CP **T15**

COREL;RASE4;DAMG2; Ion Implantation Deposition.
DE83048758 92 CP **T11**

ALPHA-M; Resolution of gamma-Ray Spectra.
DE83048413 32 CP **T09**

K-TIF; Two-Fluid PWR Downcomer Fluid Dynamics.
DE83048876 117 CP **T11**

EPISODE; Ordinary Differential Equation System Solver.
DE83048675 77 CP **T11**

GADOSE;DOSET; HTGR Accident Analysis Dose Calculations.
DE83048261 9 CP **T12**

APACHE; Two-Dimensional Chemically Reactive Fluid Flow Code.
DE83048858 113 CP **T13**

CRAC; Calculation of Reactor Accident Consequences.
DE83048722 86 CP **T16**

TSN; Spatially-Dependent Reactor Kinetics.
DE83048309 17 CP **T11**

COAST4; Costing and Sizing of Tokamak Reactors.
DE83048873 116 CP **T13**

NAHAMMER; Fluid Hammer Analysis Piping System.
DE83048717 85 CP **T09**

TACASI; Analysis of Resonance Measurements.
DE83048410 32 CP **T11**

FX2-TH; Two-Dimensional Time-Dependent Reactor Kinetics.
DE83048862 114 CP **T18**

RO75; Reverse Osmosis Desalting Plant Design.
DE83048831 107 CP **T11**

GASA (GA Stability Analysis); Stability Analysis for Reactor Kinetic Equations.
DE83048290 14 CP **T09**

ELEFUNT; Tests of FORTRAN Elementary Functions.
DE83048881 118 CP **T11**

TRIPLET; Two-Dimensional Triangular Mesh Transport Program.
DE83048608 65 CP **T14**

JUPITOR1;JP1; Coupled Channel Cross Section Evaluation.
DE83048308 16 CP **T12**

TDIST3; Community Energy Consumption Analysis.
DE83048854 112 CP **T11**

PCTEST; Principal Component Test for Outliers.
DE83048769 95 CP **T09**

LARCA; Flux-Weighting of DTF4 Cross Sections.
DE83048409 32 CP **T09**

EPOCH; Neutron Age Calculation of ENDF/B Data.
DE83048461 40 CP **T11**

COMRADEX4; Accident Released Radiological Dose.
DE83048663 74 CP **T09**

RESQ2;RESQ0;DBFL; Resonance Integral for a Hexagonal Cell.
DE83048285 13 CP **T13**

PREP;KITT; System Fault Tree Evaluation Codes.
DE83048528 52 CP **T11**

BIOSSIM; Biochemical Kinetic Simulation System.
DE83048736 88 CP **T14**

GAFGAR;P3T;PROC;TAPCOP; Spectra and Group-Averaged Cross Section Calculation.
DE83048316 17 CP **T12**

PACTOLUS;CLOTHO; Nuclear Power Plant Cost Code.
DE83048540 54 CP **T12**

OMCOST; Power Plant Non-Fuel Operation and Maintenance Cost Study.
DE83048688 79 CP **T09**

TAC3D; Transient Three-Dimensional Heat Transfer Program.
DE83048414 32 CP **T09**

COBRA4I; Rod Bundle and Core Thermal-Hydraulics.
DE83048432 35 CP **T13**

RANDOM NUMBERS; Obtained from U235 alpha Decay.
DE83048843 109 CP **T99**

BISYN; Two-Dimensional, Multigroup Diffusion Synthesis Calculations.
DE83048287 13 CP **T15**

PHROG; Multi-Group Constant and Fast Spectra Calculations.
DE83048520 51 CP **T16**

FFEARS; Laplace Equation Isotropic Dielectrics.
DE83048577 60 CP **T09**

BLOOST6; Combined Kinetics Two-Dimensional Heat Transfer.
DE83048303 16 CP **T13**

3DB; Three-Dimensional Multigroup Diffusion Burnup Analysis.
DE83048567 59 CP **T11**

PROSA2; Probabilistic Response Surface Studies.
DE83048778 97 CP **T18**

TAC2D; Steady-State and Transient Temperature Calculations.
DE83048408 31 CP **T14**

BUG2; Two-Dimensional Multigroup Diffusion and Burnup in Xy, Rz Geometries.
DE83048438 36 CP **T15**

FLOW3; Network Analysis of Three-Dimensional Two-Phase Flow.
DE83048664 75 CP **T15**

GAKER; Inelastic Scattering Cross Section Calculations for Moderators.
DE83048289 14 CP **T03**

THRES2; Statistical Model Reaction Cross Sections.
DE83048504 48 CP **T09**

NAIAD; Compressible Two-Phase Coolant Behavior.
DE83048726 87 CP **T15**

FCC4; Fundamental Mode Fast Reactor Cross Section Calculations.
DE83048306 16 CP **T11**

KEELE; Linearly-Constrained Optimization.
DE83048556 57 CP **T09**

WIGL3; One-Dimensional Space-Time Diffusion with Feedback.
DE83048708 83 CP **T12**

DATATRAN2 RAD1 Geometry Modules; Radial Geometry Modules for Two-Dimensional Input.
DE83048406 31 CP **T14**

LIFE3; Mixed-Oxide Fuel Element Performance.
DE83048460 40 CP **T12**

SUPAN; Analysis of Beam-Type Piping Supports.
DE83048842 109 CP **T09**

PSEUDO; Statistical Resonance Parameter Calculations.
DE83048292 14 CP **T03**

BESFIT; Diffraction Model Elastic Scattering Cross Sections.
DE83048524 52 CP **T09**

AEC-ALO FAU; Radio Frequency Management System.
DE83048587 62 CP **T09**

PERT4; Two-Dimensional Perturbation in Xy, Rz, and R-theta Geometry.
DE83048304 16 CP **T09**

STRAP; Static and Dynamic Structural Analysis.
DE83048539 54 CP **T14**

VARR2; CRBRP 2-Dimensional Transient Fluid Flow Analysis.
DE83048755 92 CP **T14**

CEXE;INCEXE; One-Group, Three-Dimensional Xyz Xenon Oscillation.
DE83048415 32 CP **T09**

SUPERTOG; ENDF/B Fine-Group Constants Generation.
DE83048431 35 CP **T14**

SOLVEX; Solvent Extraction Process Simulation.
DE83048662 74 CP **T09**

HOT2; Two-Dimensional Transient Heat Conduction Program.
DE83048286 13 CP **T14**

FORSIM; Solution of Partial or Ordinary Differential Equations.
DE83048514 50 CP **T11**

TRIDENT; Two-Dimensional Multigroup Transport Triangular Mesh.
DE83048741 89 CP **T14**

ZPR-III Assembly 48 GAFGAR ENDF/B Data Tapes.
DE83048356 23 CP **T14**

INCITE; Thermal Spectra and Multi-Group Constants.
DE83048565 58 CP **T17**

SYN3D; Single-Channel Flux Synthesis Diffusion.
DE83048713 84 CP **T15**

GATT; Three-Dimensional, Few-Group Diffusion Calculations in Hexagonal Geometries.
DE83048380 27 CP **T11**

PWCOST; Reactor Fuel Cycle Cost Calculation.
DE83048441 37 CP **T11**

FUELS DATA; Model Verification Fuel Rod Data.
DE83048844 110 CP **T18**

RAPFU; Fuel Cycle Parameters for Fast Breeders.
DE83048372 25 CP **T09**

DUZ2; Two-Dimensional Axisymmetric and Plane Elastic-Plastic Stress Calculations.
DE83048503 48 CP **T16**

ERF;ERFC; Error and Complementary Error Function.
DE83048601 64 CP **T03**

GLEN; Group Constant Calculations from TOR Output Data.
DE83048361 24 CP **T11**

TASK; One-Dimensional Multigroup Reactor Kinetics Program.
DE83048558 57 CP **T12**

POLUTE; Forest Air Pollutant Uptake Model.
DE83048774 96 CP **T03**

SCORE3; SCISRS ENDF/B Graphic Cross Section Evaluation.
DE83048375 26 CP **T19**

DBUFIT1; Least Squares Transmutation Analysis.
DE83048456 39 CP **T11**

LINDA; Evaluation of Strain-Gage Data.
DE83048657 74 CP **T09**

GAKIT; One-Dimensional, Multigroup Kinetics with Temperature Feedback.
DE83048370 25 CP **T13**

CLUP77; Square Cell Collision Probability Calculations.
DE83048526 52 CP **T11**

ARSTEC; Nonlinear Mixed Integer Optimization.
DE83048738 89 CP **T03**

TWOTRAN2; Two-Dimensional, Multigroup Transport in Xy, Rz, and R theta Geometries.
DE83048358 23 CP **T14**

ETOG3; ENDF/B to MUFT, GAM, ANISN Cross-Section Format.
DE83048538 54 CP **T16**

EMERALD-NORMAL; PWR Activity Release and Dose.
DE83048685 78 CP **T12**

SAFE-2D; Plane and Axisymmetric Stress Analysis.
DE83048379 27 CP **T11**

FARED; One-Dimensional Fast Reactor Design and Survey Study.
DE83048427 34 CP **T17**

CONF; Conference Attendee and Speaker Data File.
DE83048838 108 CP **T09**

ISOGEN; Radionuclide Generation and Decay.
DE83048367 24 CP **T11**

HEATING5;HEATING3; One-, Two-, or Three-Dimensional Heat Conduction Program.
DE83048517 50 CP **T11**

GEM; Analysis of Nuclear Fuel Cycle Economics.
DE83048576 60 CP **T12**

WELWING; Material Buckling of Cylindrical Fuel Elements.
DE83048362 24 CP **T09**

TOKMINA;TOKMINA2; Tokamak Fusion Reactor Study.
DE83048561 57 CP **T03**

GNASH; Particle Induced Cross Sections and Spectra.
DE83048757 92 CP **T11**

RAPP; High-Velocity Flow Study of Steam-Water Mixtures.
DE83048382 27 CP **T03**

ETOM1; ENDF/B Format to MUFT Format Cross Sections.
DE83048436 36 CP **T13**

COBRA3M; Fuel Pin Thermal-Hydraulic Analysis.
DE83048659 74 CP **T13**

BL47; Drafting Tool to Plot Plane Structures.
DE83048373 26 CP **T09**

EDITOR; ENDF/B Tape Processing and Editing.
DE83048502 48 CP **T11**

PIRAX2; Simplified Inelastic Piping Analysis.
DE83048735 88 CP **T11**

MC-2; Fast Neutron Spectra and Multigroup Cross Sections.
DE83048355 23 CP **T99**

DISPER1; Aerosol Particle Transport Study.
DE83048554 56 CP **T03**

FLANGE-ORNL; Analysis of Flanged Joints.
DE83048689 79 CP **T09**

AVERAGE; Unresolved Region Average Cross Section Calculations.
DE83048376 26 CP **T03**

SPAN4; a Point-Kernel Shield Evaluation Code.
DE83048462 41 CP **T15**

DRIFT; Cooling Tower Drift Eliminator Analysis.
DE83048837 108 CP **T11**

SNEQ; Nonlinear Algebraic Equation Solutions and Curve Plotting.
DE83048364 24 CP **T11**

ANVENT; Los of Coolant Analysis Duke Power McGuire Units.
DE83048529 52 CP **T03**

MATUS;MESH3D;APACHE; Three-Dimensional Finite-Element Elastic Analysis.
DE83048597 63 CP **T16**

TOR; Thermal Scattering for Crystalline Materials.
DE83048360 23 CP **T11**

M0678;FUGIT1; Dynamic Response of Elastic Structures.
DE83048537 53 CP **T09**

TRUMP; Transient and Steady State Temperature Distribution.
DE83048771 95 CP **T14**

TUBE; U-Tube Heat Exchanger Stress Analysis.
DE83048378 26 CP **T09**

CONTEMPT-LT/028;CONTEMPT-LT/026; Pressure-Temperature Response.
DE83048433 35 CP **T99**

BETTIS ENVIRONMENTAL LIBRARY; Bettis Programming Environment Library.
DE83048665 75 CP **T16**

NOWIG; One-Dimensional, Two-Group Kinetics with Temperature Feedback.
DE83048371 25 CP **T09**

SOCOOL2; Sodium-Fuel Interaction Analysis.
DE83048521 51 CP **T09**

CASIM; Simulates Hadronic Cascade Transport.
DE83048742 89 CP **T13**

PUN1; Unresolved Resonance Integral Cross Sections.
DE83048359 23 CP **T09**

RESPOND; Dissimilar Media TLD Correction Calculations.
DE83048566 58 CP **T03**

SITE2; Energy Facility Siting Assessment.
DE83048687 79 CP **T11**

M0266; Linear Elastic Structural Dynamics.
DE83048383 27 CP **T09**

DYNAM; Dynamic Analysis Boiling Flow Steam.
DE83048440 36 CP **T11**

SOLTES1; Thermal Energy Systems Simulation.
DE83048841 109 CP **T11**

RELAP4/MOD6; Transient Thermal-Hydraulic Study.
DE83048369 25 CP **T99**

FRCRL2; LOCA Fission Product Release Analysis.
DE83048500 47 CP **T03**

MACS LATTICE VIBRATION CODES; MACS Lattice Vibration Neutron Scattering Codes.
DE83048574 60 CP **T13**

BLAST; Reactor Kinetics Temperature Distribution Study.
DE83048363 24 CP **T03**

PWR-PPM; Boration-Dilution Tables for PWR Operation.
DE83048552 56 CP **T03**

PTA1; Pipe System Pressure Analysis.
DE83048761 93 CP **T11**

SIGPLOT; Resolved Multilevel Briet-Wigner Cross Section Calculations.
DE83048377 26 CP **T09**

DAC1; SN Perturbation Code Using DTF4 Fluxes.
DE83048455 39 CP **T09**

FRAP-T4;FRAP-T; Transient Analysis of Oxide Fuel Rods.
DE83048658 74 CP **T18**

1DX; One-Dimensional Diffusion Fast Cross Section Generation.
DE83048374 26 CP **T13**

ORTHIS;ORTHAT; Two-Dimensional Heat Conduction.
DE83048525 52 CP **T14**

MARCH1.1; LWR Meltdown Accident Response Model.
DE83048734 88 CP **T14**

CODILLI; Least Squares Analysis of Resonance Data.
DE83048347 22 CP **T09**

MULTI; Multi-Level Resonance Theory Cross-Section Calculations.
DE83048535 53 CP **T03**

GEOCOST; Geothermal Energy Cost Analysis.
DE83048684 78 CP **T15**

FLANGE2/71-1; ENDF/B Thermal Scattering Data.
DE83048368 24 CP **T11**

DOGGY; Desk Calculator Form Sheet DP Package.
DE83048428 34 CP **T11**

COMRC1; Slag Transport Models for MHD Systems.
DE83048845 110 CP **T09**

M0648; One-Dimensional Slab Transport with Slowing down.
DE83048342 21 CP **T09**

ERREST; Loss of Coolant Rod Bundle Critical Heat Flux Data Analysis.
DE83048518 50 CP **T13**

MSCAT; Slow Neutron Multiple Scattering Calculations.
DE83048575 60 CP **T12**

GAUGE; Two-Dimensional, Few-Group, Neutron Diffusion in Hexagonal Geometries.
DE83048339 21 CP **T12**

BEHAVE2; Oxide Fuel Performance Finite-Element.
DE83048568 59 CP **T12**

GAPCON-THERMAL3; Fuel Steady State and Transient Behavior.
DE83048770 95 CP **T13**

TOPS; Transient Thermodynamics of Pressurizers.
DE83048348 22 CP **T09**

HAA3B; Aerosol Behavior Lognormal Model.
DE83048443 37 CP **T11**

BESSEL FUNCTION PACKAGE; Airy and LOG gamma Subroutines.
DE83048656 73 CP **T12**

GAND; GAFGAR Cross-Section Library Preparation.
DE83048345 22 CP **T12**

CONCEPT5;CONCEPT3; Power Plant Conceptual Cost Estimate.
DE83048498 47 CP **T14**

AXICRP; Finite Element Code for Creep Analysis.
DE83048785 98 CP **T11**

M0756;LETO; One-Dimensional Slab gamma-Ray Transport.
DE83048343 21 CP **T11**

SOFIRE2 1- and 2-CELL; Sodium Pool Fire 1- and 2-Cell Analysis.
DE83048559 57 CP **T09**

SEPHIS/MOD4; Solvent Extraction Simulation.
DE83048690 79 CP **T11**

RAUMZEIT; One-Dimensional Time-Dependent Diffusion Calculations.
DE83048352 22 CP **T09**

DOT2DB; Two-Dimensional Multigroup Diffusion and SN Theory.
DE83048459 40 CP **T12**

HEMP; Hydrodynamic Elasticmagneto Plastic Flow.
DE83048775 96 CP **T14**

GANDY3; Unresolved Resonance Cross Section Calculation.
DE83048341 21 CP **T09**

ESP; Monte Carlo Reactor Analysis Calculation.
DE83048523 51 CP **T16**

PLOTR; Two-Dimensional Contour Plots and Area Calculation.
DE83048578 61 CP **T09**

GEM; Eigenvalue Problem for Vibrating Systems.
DE83048344 22 CP **T11**

PSA2; Stress Analysis Multianchor Pipe System.
DE83048542 54 CP **T09**

LINPACK; Simultaneous Linear Algebraic Equations.
DE83048800 101 CP **T15**

CINCAS; Nuclear Fuel Cycle Cost and Economics.
DE83048354 22 CP **T10**

PAX03; Harmony-PDQ Cross Section Generation Code.
DE83048426 34 CP **T17**

FTA; Fault Tree Analysis System.
DE83048666 75 CP **T11**

POWERCO; Nuclear Station Electricity Costs.
DE83048340 21 CP **T03**

GENED ENVIRONMENTAL ROUTINES; Subroutine Library.
DE83048515 50 CP **T09**

SLACKLY; One-Dimensional Multicavity Klystron Tube Analysis.
DE83048807 102 CP **T11**

AMDLIBF; Argonne Subroutine Library Category F.
DE83048563 58 CP **T11**

COMPUTER CODES

VENTURE; 1, 2, or 3-Dimensional Multigroup Diffusion.
DE83048686 79 CP **T19**

ETOG1; ENDF/B to MUFT, GAM, ANISN Cross Sections Format.
DE83048437 36 CP **T14**

TRANSPORT; Design of Charged Particle BEAMS.
DE83048791 99 CP **T12**

TDOWN; Spatial and Composition-Dependent Cross Sections.
DE83048505 48 CP T99

TWOTRAN-PNVW; Two-Dimensional Particle Transport X-Y R-Z R-theta.
DE83048573 59 CP **T12**

PARET; Water-Cooled Core Transient Analysis.
DE83048555 56 CP **T14**

SHOCK; Dynamic Response of Lumped-Mass Systems.
DE83048795 100 CP **T11**

VELVET2; Turbulent Flow in LMFBR Rod Bundle.
DE83048458 40 CP **T11**

NUBOW; Structural Analysis Bowed Reactor Cores.
DE83048643 71 CP **T09**

HERMES; Regional Radiological Effects Analysis.
DE83048527 52 CP **T14**

2DEPEP; Elliptic, Parabolic and Eigenvalue Solutions.
DE83048806 102 CP **T09**

RAHAB Lattice Physics Modules; JOSHUA System Lattice Physics Modules.
DE83048536 53 CP **T15**

LASIP3; CCCC Standard Interface File Processor.
DE83048691 80 CP **T13**

GAZE2; One-Dimensional Multigroup Diffusion in Slab, Spherical, and Cylindrical Geometries.
DE83048430 35 CP **T12**

ATM; Atmospheric Transport and Diffusion Model.
DE83048787 98 CP **T11**

ARC-SYSTEM; System Subprograms and Modules.
DE83048522 51 CP **T12**

CHECK3;RIGEL3 ENDF/B V3 Data Processing Codes.
DE83048571 59 CP **T12**

AMDLIBAE; Argonne Subroutine Library Categories A-E.
DE83048562 58 CP **T15**

OPTRM; Hydrologic Transport with Optimization.
DE83048794 100 CP **T12**

BUGTRI; Two-Dimensional Multigroup Diffusion and Burnup in Triangular Geometries.
DE83048439 36 CP **T15**

NRTS ENVIRONMENTAL SUBROUTINES; FORTRAN Utilities.
DE83048613 66 CP **T16**

ENDRUN2; Multigroup Constants from ENDF/B Data.
DE83048501 48 CP **T14**

TVENT; Ventilation System Transient Analysis.
DE83048809 103 CP **T11**

U3R; Unresolved Resonance Cross Section Probability Tables.
DE83048553 56 CP **T11**

NUFUEL; Nuclear Fuel Cycle Requirements.
DE83048683 78 CP **T11**

3DDT; Three-Dimensional Multigroup Diffusion Xyz or R-theta-Z.
DE83048463 41 CP **T12**

CONDYN; Polya Model Secondary Electron Spectra.
DE83048786 98 CP **T03**

CLEM; Angular Distribution Legendre Fitting.
DE83048531 53 CP **T09**

GROUP2; Group Theory of Lattice Dynamics.
DE83048620 67 CP **T11**

ARC-NUI002 BCD Input Processor; BCD Input Data Processing Module.
DE83048533 53 CP **T14**

TDIST2; Community Energy Consumption Analysis.
DE83048799 101 CP **T11**

HEATMESH; Geometrical Data Heat Transfer Study.
DE83048434 35 CP **T09**

PROGLOOK; User Program Performance Monitor.
DE83048642 71 CP **T11**

VENUS2; Two-Dimensional Coupled Neutronics-Hydrodynamics.
DE83048511 49 CP **T11**

WHTM; Wisconsin Hydrologic Transport Model.
DE83048808 103 CP **T12**

VIEWPIN; View Factor Calculations for Cylindrical Pins.
DE83048569 59 CP **T09**

REXCO-H (Release 2); Two-Dimensional Hydrodynamic Response to Excursion.
DE83048615 66 CP **T11**

BURST1; Hydrodynamic Analysis During Blowdown.
DE83048435 36 CP T13

ODMOD; Soil-Water Trace-Containment Transport.
DE83048789 99 CP **T11**

JP1XR; Coupled-Channel Scattering Cross Section Calculations.
DE83048506 49 CP **T11**

GRAPH; Linear Regression with Confidence Limits.
DE83048624 68 CP **T12**

GAMB1T; Cross Section Generation for Transport Codes.
DE83048547 55 CP **T16**

MSF21;VTE21; Desalination Plant Optimization.
DE83048798 100 CP **T12**

GSSLRN1B; Least Squares Photopeak Spectra Code.
DE83048457 39 CP **T11**

POLLA; Converts R-Matrix Resonance Parameters.
DE83048639 71 CP T03

PHASER; Phase Shift Cross Section and Polarization Calculations.
DE83048507 49 CP **T03**

CHART; Iodine Decay Heat on Charcoal Adsorbers.
DE83048804 102 CP **T11**

ENDF/B-THERMOS; 30-Group ENDF/B Scattering Kernels.
DE83048543 54 CP **T14**

INDX; X-Ray Diffraction Powder Pattern Indexing.
DE83048609 65 CP **T09**

ASPIS; Gamma-Ray Source Buildup Factor Calculations.
DE83048429 34 CP **T11**

EVITS; Steady State Two-Dimensional Fluid Flow.
DE83048792 99 CP **T09**

MIRAB;MIRAP; Containment System Iodine Removal.
DE83048499 47 CP **T11**

GAPCON-THERMAL2 Rev. 1; Fuel Rod Thermal Performance.
DE83048618 67 CP **T12**

AMDLIBGZ; Argonne Subroutine Library Categories G-Z.
DE83048564 58 CP **T11**

SKILLS INVENTORY; Personnel Information System.
DE83048801 101 CP **T11**

ROPE; Finding Roots of a Polynomial.
DE83048444 37 CP **T09**

GAMTAB; Radioactive-Decay gamma-Ray Catalog.
DE83048637 70 CP **T16**

MUCHA1;MUCHA2; Multiple Channel Analysis Emergency Core Cooling.
DE83048508 49 CP **T13**

DOPSEL; Self-Shielding in the Resonance Region.
DE83048805 102 CP **T11**

REXCO-H (Release 1); Two-Dimensional Hydrodynamic Response to Excursion.
DE83048550 56 CP **T11**

CHILES; Linear Elastic Singularity Modeling.
DE83048611 66 CP **T11**

PHENIX; Two-Dimensional Diffusion Burnup Refueling History.
DE83048454 39 CP **T11**

NUBOW-2D Inelastic; Bowed Reactor Core Analysis.
DE83048790 99 CP **T09**

THETA1B; Fuel-Rod Thermal Response Loss of Coolant Accidents.
DE83048512 50 CP **T16**

KEFF;MGBS;TGAN; Nuclear Criticality Safety.
DE83048617 67 CP **T12**

HYMAS; Hydrodynamic Mass Matrix Generation.
DE83048560 57 CP **T09**

CHNSED; Sediment and Containment Transport Model.
DE83048793 99 CP **T12**

SAFE-CRACK; Viscoelastic Analysis of Concrete.
DE83048451 38 CP **T11**

DYNAMIC ANALYSIS OF GASES; Dynamic Analysis of Gases by Mass Spectrometry.
DE83048645 72 CP **T03**

VIM1;VIM1X; Monte Carlo Critical Assembly Analysis.
DE83048510 49 CP **T99**

CREEP-PLAST2; Two-Dimensional Inelastic Structural Analysis.
DE83048810 103 CP **T13**

BETTY; Entrained Particles Sampling Study.
DE83048545 55 CP **T03**

HISTOGRAMS; Quality Control Sample Statistics.
DE83048614 66 CP **T09**

KENO2;KENO4; Monte Carlo Multigroup Criticality Code.
DE83048450 38 CP **T17**

SULCAL; Model of Sulfur Chemistry in a Plume.
DE83048788 98 CP **T09**

ETOT2; Thermal Libraries from ENDF/B Data.
DE83048509 49 CP **T12**

VARI-1D; One-Dimensional Variational Sensitivity.
DE83048625 68 CP T14

STRIPE;M0650; Fuel Rod Clad Strain and Pellet Cracking.
DE83048570 59 CP **T09**

HAARM3; Aerosol Behavior LOG-Normal Dist Model.
DE83048797 100 CP **T11**

LIZARD4; Nonlinear Differential Equations Solution.
DE83048445 37 CP **T11**

SAP4; Structural Analysis of Linear Systems.
DE83048641 71 CP **T14**

CAGE;BIRD;SPEC; Time-of-Flight Data Analysis.
DE83048476 43 CP **T11**

COVE1; Creep Collapse for Oval Fuel Pin Tube.
DE83048817 105 CP **T11**

CEBUG; Steam Generator Sodium-Water Reaction.
DE83048548 55 CP **T09**

OMESH;RENUM; Self-Organizing Mesh Generation.
DE83048612 66 CP **T13**

MOST; A Multidimensional Optimization Scheme.
DE83048446 37 CP **T03**

SCHAFF; Heat and Water Transfer in Porous Media.
DE83048802 101 CP **T11**

TROUT; MUG Multigroup Cross Section Library Maintenance.
DE83048493 46 CP **T11**

BH99; Extreme Value Distribution Data Analysis.
DE83048621 67 CP **T09**

EMERALD REVISION 1; PWR Accident Activity Release.
DE83048546 55 CP **T13**

COMB; One-Dimensional High-Temperature Coal Combustor Model.
DE83048811 103 CP **T09**

SHELL5; Thin Shell Three-Dimensional Structural Analysis.
DE83048452 39 CP **T11**

DE/STEP,INTRP;DEROOT/STEP,INTRP; Solution of Ordinary Differential Equations.
DE83048640 71 CP **T11**

BUSHL; Cylindrical Shell Buckling Collapse Analysis.
DE83048481 44 CP **T11**

GLOVE CHANGE ANALYSIS SYSTEM; Glove Data Base.
DE83048813 104 CP **T11**

PLOT-3D; Three-Dimensional Plots on IBM2280 or CalComp780.
DE83048544 55 CP **T09**

HAFMAT; System Steady-State Flow Distribution.
DE83048616 67 CP **T11**

CYGRO3; Oxide Fuel Rod Stress and Deformation.
DE83048449 38 CP **T15**

ALVIN; Differential-Integral Data Consistency.
DE83048815 104 CP **T15**

CHIC-KIN; Fast and Intermediate Power Transients.
DE83048473 42 CP **T12**

SETS; Set Equation Transformation System.
DE83048623 68 CP **T11**

MOXY/MOD032; BWR Core Heat Transfer Code.
DE83048551 56 CP **T18**

CONTEMPT4/MOD2; Multicompartment Containment.
DE83048818 105 CP **T99**

FLASH6;FLASH4; Fully-Implicit Transient Simulation.
DE83048448 38 CP **T15**

RIGEL4;CHECK4;SUMUP4;LISTF4; PLOTF4;RESEND;CRECT;DICT4;CAREN4 ENDF/B V4 Processing Codes.
DE83048638 70 CP **T15**

RAMP1; Reich-Moore Resolved Region Cross-Sections.
DE83048492 46 CP **T09**

DPOLE; Helmholtz Equation on General Three-Dimensional Region.
DE83048816 104 CP **T11**

ETOG1 Data for MUFT and GAM Libraries; MUFT4 or 5, GAM1 or 2.
DE83048447 37 CP **T16**

FUNPACK Release 2; Special Function Routines.
DE83048610 66 CP **T14**

GASPAN; Complex gamma-Ray Spectra Analysis.
DE83048485 45 CP **T09**

TRITMOD; Advection Model of Tritium Dispersion.
DE83048814 104 CP T03

RICE; Primary Recoil Atom Spectra ENDF/B Data.
DE83048453 39 CP **T11**

TOODY2; Two-Dimensional Lagrangian Equations of Motion Solution.
DE83048627 68 CP **T11**

OX1; Ouasistatic Spatial Reactor Kinetics Code.
DE83048474 42 CP **T14**

ANOVA; Three Factor Analysis of Variance.
DE83048819 105 CP **T09**

SYN; Two-Dimensional Synthesis Multigroup Diffusion and One-Group Depletion.
DE83048495 46 CP **T17**

LATIN SQ; N X N Latin Square Experimental Design.
DE83048630 69 CP **T11**

TIDY-J; FORTRAN Source Code Editing Processor.
DE83048896 121 CP **T11**

MORTRAN2; Macro-Based Structured FORTRAN.
DE83048678 77 CP **T12**

TIDY3;TIDY4; Utility to Edit FORTRAN Source Programs.
DE83048857 113 CP **T12**

GETCOR;FRECOR; FORTRAN Dynamic Storage Allocation.
DE83048644 71 CP **T09**

FOSSIL-FUEL POWER PLANTS

CONCEPT5;CONCEPT3; Power Plant Conceptual Cost Estimate.
DE83048498 47 CP **T14**

SULCAL; Model of Sulfur Chemistry in a Plume.
DE83048788 98 CP **T09**

OMCOST; Power Plant Non-Fuel Operation and Maintenance Cost Study.
DE83048688 79 CP **T09**

FOSSIL FUELS

ASPEN; Advanced System for Process Engineering.
DE83048979 138 CP **T99**

FUEL-CLADDING INTERACTIONS

DSTRESS; Transient Fuel Model for Clad Strain.
DE83048906 123 CP **T11**

PECS3; Probabilistic Evaluation Cladding Life.
DE83048868 115 CP **T11**

FUEL-COOLANT INTERACTIONS

SOCOOL2; Sodium-Fuel Interaction Analysis.
DE83048521 51 CP **T09**

SPIRT; Stress-Strains from Transient Pressures.
DE83048927 128 CP **T13**

FUEL CYCLE

RELOAD FEVER; One-Dimensional, Few-Group Diffusion Depletion.
DE83048221 6 CP **T12**

PWCOST; Reactor Fuel Cycle Cost Calculation.
DE83048441 37 CP **T11**

REFCO8; Discounted Cash Flow Fuel Cycle Cost.
DE83048855 112 CP **T15**

NPRFCCP; Fuel Cycle Costs Performance Data.
DE83048146 3 CP **T09**

FUMBLE; Fast Reactor Fuel Burnup and Management.
DE83048480 44 CP **T13**

GEM; Analysis of Nuclear Fuel Cycle Economics.
DE83048576 60 CP **T12**

WAMPUM; Fuel Cycle Costs Performance Study.
DE83048224 7 CP **T09**

CINCAS; Nuclear Fuel Cycle Cost and Economics.
DE83048354 22 CP **T10**

REBUS2; Fuel Cycle Analysis for Fast Reactors.
DE83048634 69 CP **T99**

GAFFE; Equilibrium Fuel Cycle Calculation.
DE83048302 16 CP **T11**

NUFUEL; Nuclear Fuel Cycle Requirements.
DE83048683 78 CP **T11**

RAPFU; Fuel Cycle Parameters for Fast Breeders.
DE83048372 25 CP **T09**

FUEL ELEMENT CLUSTERS

CLUP77; Square Cell Collision Probability Calculations.
DE83048526 52 CP **T11**

ORRIBLE; Rod Bundle Flow and Temperature Distribution.
DE83048629 69 CP **T12**

VELVET2; Turbulent Flow in LMFBR Rod Bundle.
DE83048458 40 CP **T11**

FUEL ELEMENTS

MANTA; Steady-State Thermal-Hydraulic Analysis.
DE83048256 9 CP **T12**

FUELS DATA; Model Verification Fuel Rod Data.
DE83048844 110 CP **T18**

STRIPE;M0650; Fuel Rod Clad Strain and Pellet Cracking.
DE83048570 59 CP **T09**

FREVAP6; HTGR Metallic Fission Product Release.
DE83048301 15 CP **T09**

THI3D; Thermal-Hydraulic Multichannel Analysis.
DE83048706 83 CP **T13**

ORTHIS;ORTHAT; Two-Dimensional Heat Conduction.
DE83048525 52 CP **T14**

WELWING; Material Buckling of Cylindrical Fuel Elements.
DE83048362 24 CP **T09**

WREM-TOODEE2/MOD3; Two-Dimensional Time-Dependent Fuel Element Study.
DE83048712 84 CP **T14**

LIFE3; Mixed-Oxide Fuel Element Performance.
DE83048460 40 CP **T12**

CYGRO2; Stress Analysis of Cylindrical Fuel Elements.
DE83048266 10 CP **T11**

VIEWPIN; View Factor Calculations for Cylindrical Pins.
DE83048569 59 CP **T09**

GLUB1; Water-Logged Fuel Element Analysis.
DE83048424 33 CP **T11**

BUBL1; Fuel Swelling and Gas Release Simulation.
DE83048468 42 CP **T09**

FIGRO; LWBR Fuel Swelling Temperature Study.
DE83048272 11 CP **T11**

BEHAVE2; Oxide Fuel Performance Finite-Element.
DE83048568 59 CP **T12**

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DE83048480 44 CP **T13**

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PELEN; Fuel Pellet Temperature and Deformation.
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DE83048906 123 CP **T11**

COVE1; Creep Collapse for Oval Fuel Pin Tube.
DE83048817 105 CP **T11**

PECS3; Probabilistic Evaluation Cladding Life.
DE83048868 115 CP **T11**

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DE83048677 77 CP **T09**

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DE83048330 20 CP **T11**

SCORE-EVET; Three-Dimensional Hydraulic Reactor Core Analysis.
DE83048931 129 CP **T14**

GAPCON-THERMAL3; Fuel Steady State and Transient Behavior.
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THETA1B; Fuel Rod Thermal Response Loss of Coolant Accidents.
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GAPCON-THERMAL2 Rev. 1; Fuel Rod Thermal Performance.
DE83048618 67 CP **T12**

CYGRO3; Oxide Fuel Rod Stress and Deformation.
DE83048449 38 CP **T15**

FRAPCON2;FRAP-S3;FRAP-S1; Steady State Analysis Oxide Fuel Rods.
DE83048694 80 CP **T16**

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DE83048481 44 CP **T11**

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DE83048658 74 CP **T18**

ERREST; Loss of Coolant Rod Bundle Critical Heat Flux Data Analysis.
DE83048518 50 CP **T13**

MUCHA1;MUCHA2; Multiple Channel Analysis Emergency Core Cooling.
DE83048508 49 CP **T13**

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GAMMA FUNCTION

BESSEL FUNCTION PACKAGE; Airy and LOG gamma Subroutines.
DE83048656 73 CP **T12**

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DE83048047 2 CP **T09**

ASPIS; Gamma-Ray Source Buildup Factor Calculations.
DE83048429 34 CP **T11**

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GAUSS6; Batch Analysis of Gamma-Ray Spectra.
DE83048622 68 CP **T15**

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DE83048333 20 CP **T11**

CORGAM; Unfolding of Complex gamma-Ray Spectra.
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6KILER; Core Heatup Code for BWR/6 Analysis.
DE83048636 70 CP **T09**

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SECTION.REV1; Plot Geochemical Drill Hole Data.
DE83048977 138 CP **T09**

GEOTHERMAL POWER PLANTS

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GCFM5.0; Geothermal Field and Power Plant Costs.
DE83048976 138 CP **T14**

GEOCOST-BC; Binary Cycle Geothermal Cost Study.
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TERZAGI; Isothermal Fluid Flow and Subsidence.
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SCHAFF; Heat and Water Transfer in Porous Media.
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SHAFT79; Two-Phase Geothermal Reservoir Model.
DE83048893 121 CP **T16**

SOLTES1; Thermal Energy Systems Simulation.
DE83048841 109 CP **T11**

CCC; One-Phase Conduction Convection Compaction.
DE83048892 121 CP **T11**

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WELBORE; Transient Wellbore Fluid Flow Model.
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DE83048813 104 CP **T11**

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SWIFT; Waste-Isolation Flow and Transport Model.
DE83048973 137 CP **T99**

OPTRM; Hydrologic Transport with Optimization.
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ENDRUN2; Multigroup Constants from ENDF/B Data.
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DE83048416 33 CP **T03**

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HAMOC; Fluid Hammer Analysis of Piping System.
DE83048710 84 CP **T11**

AXICRP; Finite Element Code for Creep Analysis.
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MELT3; Fast Reactor Transient Overpower Study.
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PTA1; Pipe System Pressure Analysis.
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DE83048330 20 CP **T11**

MOXY/MOD032; BWR Core Heat Transfer Code.
DE83048551 56 CP **T18**

HETRAP; Fuel Rod Response LOCA Experiments.
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FLASH3; Loss-of-Coolant Accident Analysis.
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BEACON/MOD3; Containment System Fluid Flow.
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FRCRL2; LOCA Fission Product Release Analysis.
DE83048500 47 CP **T03**

CORRAL2; Radionuclide Containment after LOCA.
DE83048745 90 CP **T11**

THETA1B; Fuel Rod Thermal Response Loss of Coolant Accidents.
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ERREST; Loss of Coolant Rod Bundle Critical Heat Flux Data Analysis.
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ANVENT; Los of Coolant Analysis Duke Power McGuire Units.
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MUCHA1;MUCHA2; Multiple Channel Analysis Emergency Core Cooling.
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LWBR TYPE REACTORS

TCB01; Creep-Buckling of Tubes under Pressure.
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PTTOPT; Point-to-Point Tool APT Postprocessor.
DE83048951 133 CP **T11**

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DE83048950 133 CP **T11**

MACROCOMPROGRAMMING

FORTIO: FORTRAN Interface to IBM370 MACROS.
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MACROPROGRAMMING

MORTRAN2; Macro-Based Structured FORTRAN.
DE83048678 77 CP **T12**

MAGNETIC CARDS

UPD; Source Deck Maintenance Utility Routine.
DE83048864 114 CP **T13**

MAGNETIC DISKS

DYNDSK; Optimal Disk Data Set Reordering.
DE83048729 87 CP **T09**

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PABLM; Accumulated Environment Radiation Dose.
DE83048926 128 CP **T12**

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MAP PROJECTION

CATCH; Map Projection Subroutine Package.
DE83048872 116 CP **T11**

MAPS

CATCH; Map Projection Subroutine Package.
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AMDLIBF; Argonne Subroutine Library Category F.
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BL47; Drafting Tool to Plot Plane Structures.
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SAP4; Structural Analysis of Linear Systems.
DE83048641 71 CP **T14**

SHELL5; Thin Shell Three-Dimensional Structural Analysis.
DE83048452 39 CP **T11**

SAFE-AXISYM; Stress Analysis of Axisymmetric Load.
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CREEP-PLAST2; Two-Dimensional Inelastic Structural Analysis.
DE83048810 103 CP **T13**

STRAP; Static and Dynamic Structural Analysis.
DE83048539 54 CP **T14**

STEM; Matrix Generation for a System of BEAMS.
DE83048337 20 CP **T03**

CREEP-PLAST; Two-Dimensional Inelastic Structural Analysis.
DE83048707 83 CP **T13**

HEATMESH; Geometrical Data Heat Transfer Study.
DE83048434 35 CP **T09**

GEM; Eigenvalue Problem for Vibrating Systems.
DE83048344 22 CP **T11**

M0678;FUGIT1; Dynamic Response of Elastic Structures.
DE83048537 53 CP **T09**

M0552; Dynamic Analysis of Linear Elastic Systems.
DE83048283 13 CP **T09**

SAFE-CRACK; Viscoelastic Analysis of Concrete.
DE83048451 38 CP **T11**

GRDWRK; Grid Generation for Safe Programs.
DE83048296 14 CP **T09**

M0266; Linear Elastic Structural Dynamics.
DE83048383 27 CP **T09**

SAFE-PLANE; Plane Stress Analysis, Two-Dimensional Bodies.
DE83048252 8 CP **T09**

SAFE-3D; Three-Dimensional Composite Structure Stress Study.
DE83048332 20 CP **T12**

SAFE-2D; Plane and Axisymmetric Stress Analysis.
DE83048379 27 CP **T11**

DATATRAN2 RAD1 Geometry Modules; Radial Geometry Modules for Two-Dimensional Input.
DE83048406 31 CP **T14**

DATATRAN2 Utility Plotting Modules; Utility Plot Modules F(X) and F(X,Y).
DE83048407 31 CP **T12**

FINEL; Finite-Element Study in Two- and Three-Dimensonal Structures.
DE83048404 31 CP **T09**

MEETINGS

CONF; Conference Attendee and Speaker Data File.
DE83048838 108 CP **T09**

MELTDOWN

MARCH1.1; LWR Meltdown Accident Response Model.
DE83048734 88 CP **T14**

MEMORY DEVICES

DUMP; User-Oriented Memory Dump Utility.
DE83048698 81 CP **T11**

MESH GENERATION

INGEN; Finite Element Program Mesh Generator.
DE83048975 138 CP **T12**

ZONE; Two-Dimensional Finite Element Mesh Generator.
DE83048765 94 CP **T11**

SLIC; Interactive Graphics Three-Dimensional Mesh Generation.
DE83048968 136 CP **T14**

QMESH;RENUM; Self-Organizing Mesh Generation.
DE83048612 66 CP **T13**

EURCYL1; Cylinder-Cylinder Intersection Mesh Generator.
DE83048746 90 CP **T09**

METEOROLOGICAL DATA

DOECTZDATA; California Sixteen-Zone Weather Data.
DE83048982 139 CP **T99**

METEOROLOGY

SOLDATABQ62; Albuquerque 1962 Solar Data.
DE83048693 80 CP **T15**

DOECTZDATA; California Sixteen-Zone Weather Data.
DE83048982 139 CP **T99**

METRIC SYSTEM

DWG100RQ;DWG101RQ; Convert to or from SI Units.
DE83048812 104 CP **T11**

MICROHARDNESS

MICHRD; Microhardness Measurement Analysis.
DE83048421 33 CP **T09**

MOBILE HOMES

MOBY; Mobile Home Heating and Cooling Energy Use.
DE83048724 86 CP **T09**

MODERATORS

FLANGE1; Scattering Law Cross Section Calculation.
DE83048247 7 CP **T09**

GAKER; Inelastic Scattering Cross Section Calculations for Moderators.
DE83048289 14 CP **T03**

AILMOE; Cross Section Calculation of Elastic Scattering Resonances.
DE83048147 3 CP **T13**

GASKET; Thermal Scattering Law Calculation.
DE83048263 10 CP **T09**

MONTE CARLO METHOD

MOCARS; MC Distribution and Simulation Limits.
DE83048912 125 CP **T12**

SAMPLE; Monte Carlo Uncertainty Analysis Code.
DE83048879 117 CP **T03**

MORTRAN 2 PROGRAMMING LANGUAGE

MORTRAN2; Macro-Based Structured FORTRAN.
DE83048678 77 CP **T12**

MOTORS

MANE1; Rectangular Magnetic Network Solution.
DE83048412 32 CP **T09**

MULTI-CHANNEL ANALYZERS

TOAD; Processing of Analyzer gamma-Ray Spectra.
DE83048333 20 CP **T11**

MULTIGROUP THEORY

MINX; Multigroup Cross Sections from ENDF/B-IV Data.
DE83048851 111 CP **T17**

VENTURE; 1, 2, or 3-Dimensional Multigroup Diffusion.
DE83048686 79 CP **T19**

TIMEX; One-Dimensional Time-Dependent Multigroup Discrete Ordinates.
DE83048756 92 CP **T12**

TRIDENT; Two-Dimensional Multigroup Transport Triangular Mesh.
DE83048741 89 CP **T14**

MULTIVARIATE ANALYSIS

ANOVA; Three Factor Analysis of Variance.
DE83048819 105 CP **T09**

SPEKEN; Pearson, Spearman and Kendall Correlation.
DE83048781 97 CP **T09**

PCTEST; Principal Component Test for Outliers.
DE83048769 95 CP **T09**

SOERP; Second-Order Error Propagation Code.
DE83048764 94 CP **T03**

NETWORK ANALYSIS

SETS; Set Equation Transformation System.
DE83048623 68 CP **T11**

NEUTRON AGE

EPOCH; Neutron Age Calculation of ENDF/B Data.
DE83048461 40 CP **T11**

NEUTRON CROSS SECTIONS

NJOY; Neutron and Photon Cross Sections from ENDF/B.
DE83048883 118 CP **T99**

SCORE3; SCISRS ENDF/B Graphic Cross Section Evaluation.
DE83048375 26 CP **T19**

GAMB1T; Cross Section Generation for Transport Codes.
DE83048547 55 CP **T16**

ACSAP; Resonance Region Cross Section Analysis.
DE83048880 118 CP **T12**

SUMOR;M0271; S-Wave Neutron Cross Section Calculation.
DE83048399 30 CP **T09**

MC-2; Fast Neutron Spectra and Multigroup Cross Sections.
DE83048355 23 CP **T99**

NEUTRON DIFFUSION EQUATION

EQUIPOISE3; Two-Dimensional, Two-Group Diffusion in Slabs or Cylinders.
DE83048039 1 CP **T11**

FX2-TH; Two-Dimensional Time-Dependent Reactor Kinetics.
DE83048862 114 CP **T18**

PDQ8;PDQ7; One-, Two-, or Three-Dimensional, Few Group Diffusion Depletion.
DE83048275 11 CP **T99**

RELOAD FEVER; One-Dimensional, Few-Group Diffusion Depletion.
DE83048221 6 CP **T12**

BNWIGL;UNIWIGL; Two-Group Time-Dependent, One-Dimensional Diffusion.
DE83048870 115 CP **T15**

CITATION; One-, Two-, and Three-Dimensional Diffusion Depletion Using Multigroup Theory.
DE83048387 28 CP **T16**

FAIMOS; One-Dimensional, Multigroup Diffusion in Slab, Cylindrical, or Spherical Geometries.
DE83048120 3 CP **T11**

ADEP; One-Dimensional and Two-Dimensional Few-Group Space-Time Kinetics.
DE83048494 46 CP **T09**

GATT; Three-Dimensional, Few-Group Diffusion Calculations in Hexagonal Geometries.
DE83048380 27 CP **T11**

TEMPEST2; Thermal Neutron Spectrum Cross Sections.
DE83048050 2 CP **T11**

BUGTRI; Two-Dimensional Multigroup Diffusion and Burnup in Triangular Geometries.
DE83048439 36 CP **T15**

BISYN; Two-Dimensional, Multigroup Diffusion Synthesis Calculations.
DE83048287 13 CP **T15**

HFN; One-Dimensional, Multigroup Diffusion in Slabs, Cylinders, and Spheres.
DE83048241 7 CP **T11**

SYN; Two-Dimensional Synthesis Multigroup Diffusion and One-Group Depletion.
DE83048495 46 CP **T17**

NOAH; One-Dimensional, One-Group Space-Time Diffusion Feedback.
DE83048405 31 CP **T11**

SIZZLE; One-Dimensional Multigroup Diffusion Depletion.
DE83048058 2 CP **T13**

GAZE2; One-Dimensional Multigroup Diffusion in Slab, Spherical, and Cylindrical Geometries.
DE83048430 35 CP **T12**

1DX; One-Dimensional Diffusion Fast Cross Section Generation.
DE83048374 26 CP **T13**

PERT; One-Dimensional Perturbation for AIM and FOG Codes.
DE83048030 1 CP **T03**

3DDT; Three-Dimensional Multigroup Diffusion Xyz or R-theta-Z.
DE83048463 41 CP **T12**

MACH1; One-Dimensional, Multigroup Diffusion in Slabs, Cylinders, and Spheres.
DE83048262 9 CP **T15**

GAMBLE5; Two-Dimensional, Multigroup Diffusion in Xy and Rz Geometry.
DE83048222 7 CP **T14**

BUG2; Two-Dimensional Multigroup Diffusion and Burnup in Xy, Rz Geometries.
DE83048438 36 CP **T15**

STINT3; Single-Channel Space-Time Synthesis.
DE83048389 28 CP **T09**

EXTERMINATOR2; Two-Dimensional, Multigroup Diffusion Program.
DE83048156 4 CP **T12**

MONA; One-Dimensional Multigroup Diffusion in Slab, Cylindrical, and Spherical Geometry.
DE83048582 61 CP **T14**

MC-2; Fast Neutron Spectra and Multigroup Cross Sections.
DE83048355 23 CP **T99**

AIM6; One-Dimensional Multi-Group Diffusion in Slabs, Cylinders, and Spheres.
DE83048029 1 CP **T11**

WIGL2; One-Dimensional, Two-Group Space-Time Diffusion.
DE83048274 11 CP **T12**

2DF; Two-Dimensional, Multigroup Discrete Ordinate Code.
DE83048173 4 CP **T12**

GAMTRI; Two-Dimensional, Multigroup, Diffusion Triangular Mesh Geometries.
DE83048401 30 CP **T14**

FEVER; One-Dimensional, Few-Group Diffusion Depletion Program.
DE83048117 2 CP **T11**

NOWIG; One-Dimensional, Two-Group Kinetics with Temperature Feedback.
DE83048371 25 CP **T09**

FOG; One-Dimensional Few-Group Diffusion Slab Cylinder Sphere.
DE83048028 1 CP **T11**

M0807; Two-Dimensional Diffusion Absorption Removal Cross Sections.
DE83048280 12 CP **T09**

VARI-QUIR; Time-Dependent, Two-Dimensional, Multigroup Diffusion.
DE83048212 6 CP **T11**

FEVER7; One-Dimensional Multigroup Diffusion and Depletion.
DE83048318 18 CP **T12**

RAUMZEIT; One-Dimensional Time-Dependent Diffusion Calculations.
DE83048352 22 CP **T09**

THREDES; One-Dimensional Few Group Diffusion Design System.
DE83048273 11 CP **T14**

TEMCO7; Temperature Coefficient Calculation.
DE83048320 18 CP **T12**

GAKIT; One-Dimensional, Multigroup Kinetics with Temperature Feedback.
DE83048370 25 CP **T13**

HAMMER;LITHE;HELP; Critical Analysis System.
DE83048277 12 CP **T15**

TWIGL;TWIGGLE; Two-Dimensional, Two-Group Space-Time Diffusion Feedback.
DE83048338 20 CP **T09**

CAESAR4; LIBLST; One-Dimensional, Multigroup Diffusion.
DE83048270 10 CP **T15**

GAKIN2; 10 Multigroup, Time-Dependent Diffusion.
DE83048310 17 CP **T11**

2DB; Two-Dimensional Multigroup Diffusion and Depletion.
DE83048325 19 CP **T11**

GAUGE; Two-Dimensional, Few-Group, Neutron Diffusion in Hexagonal Geometries.
DE83048339 21 CP **T12**

GASP7; One-Dimensional Burnup Power Distribution Search.
DE83048319 18 CP **T12**

NEUTRON DOSIMETRY

DOS; Neutron Flux-Dosimeter Activity Relation.
DE83048423 33 CP **T03**

NEUTRON FLUX

TRIAL; Three-Dimensional Reaction Rates from Two-Dimensional Flux Sets.
DE83048585 62 CP **T09**

GAFGAR;P3T;PROC;TAPCOP; Spectra and Group-Averaged Cross Section Calculation.
DE83048316 17 CP **T12**

NEUTRON REACTIONS

ACSAP; Resonance Region Cross Section Analysis.
DE83048880 118 CP **T12**

HAUSER5; Nuclear Reaction Cross Sections.
DE83048830 107 CP **T13**

PUN1; Unresolved Resonance Integral Cross Sections.
DE83048359 23 CP **T09**

NJOY; Neutron and Photon Cross Sections from ENDF/B.
DE83048883 118 CP **T99**

DOPSEL; Self-Shielding in the Resonance Region.
DE83048805 102 CP **T11**

LARCA; Flux-Weighting of DTF4 Cross Sections.
DE83048409 32 CP **T09**

FSDP3; Pointwise Cross Sections from Breit-Wigner Parameters.
DE83048216 6 CP **T09**

MINX; Multigroup Cross Sections from ENDF/B-IV Data.
DE83048851 111 CP **T17**

GGC4; Multigroup Cross Sections Fast Thermal Spectra.
DE83048298 15 CP **T15**

FLANGE1; Scattering Law Cross Section Calculation.
DE83048247 7 CP **T09**

PHASER; Phase Shift Cross Section and Polarization Calculations.
DE83048507 49 CP **T03**

MC-2; Fast Neutron Spectra and Multigroup Cross Sections.
DE83048355 23 CP **T99**

GRAMP; Reich-Moore Parameters of Unresolved Resonances.
DE83048470 42 CP **T03**

SUMOR;M0271; S-Wave Neutron Cross Section Calculation.
DE83048399 30 CP **T09**

RICE; Primary Recoil Atom Spectra ENDF/B Data.
DE83048453 39 CP **T11**

GANDY3; Unresolved Resonance Cross Section Calculation.
DE83048341 21 CP **T09**

LASL Group-Averaged Cross-Sections; SN 18- 24- and 25-Group Sets.
DE83048532 53 CP **T15**

SCORE3; SCISRS ENDF/B Graphic Cross Section Evaluation.
DE83048375 26 CP **T19**

RAMP1; Reich-Moore Resolved Region Cross-Sections.
DE83048492 46 CP **T09**

GROUSE; Space-Dependent Cross Section Generation.
DE83048420 33 CP **T11**

ENDF/B-THERMOS; 30-Group ENDF/B Scattering Kernels.
DE83048543 54 CP **T14**

JUPITOR1;JP1; Coupled Channel Cross Section Evaluation.
DE83048308 16 CP **T12**

JP1XR; Coupled-Channel Scattering Cross Section Calculations.
DE83048506 49 CP **T11**

CHECKER;CRECT;DAMMET;PLOTFB; SLAVE3 ENDF/B V1 Processing Codes.
DE83048384 27 CP **T14**

COMNUC;CASCADE; Compound Nucleus Reaction.
DE83048482 44 CP **T11**

ETOX3; Multigroup Constants from ENDF/B for One Dimension.
DE83048388 28 CP **T13**

MULTI; Multi-Level Resonance Theory Cross-Section Calculations.
DE83048535 53 CP **T03**

AVOID; Annular Void Cross Section Calculation.
DE83048276 12 CP **T03**

THRES2; Statistical Model Reaction Cross Sections.
DE83048504 48 CP **T09**

ZPR-III Assembly 48 GAFGAR ENDF/B Data Tapes.
DE83048356 23 CP **T14**

AVERAGE; Unresolved Region Average Cross Section Calculations.
DE83048376 26 CP **T03**

GAND; GAFGAR Cross-Section Library Preparation.
DE83048345 22 CP **T12**

SIGPLOT; Resolved Multilevel Briet-Wigner Cross Section Calculations.
DE83048377 26 CP **T09**

CODILLI; Least Squares Analysis of Resonance Data.
DE83048347 22 CP **T09**

1DX; One-Dimensional Diffusion Fast Cross Section Generation.
DE83048374 26 CP **T13**

NEUTRON SCATTERING

MACS LATTICE VIBRATION CODES; MACS Lattice Vibration Neutron Scattering Codes.
DE83048574 60 CP **T13**

CLEM; Angular Distribution Legendre Fitting.
DE83048531 53 CP **T09**

HEXSCAT; Elastic Scattering Cross Sections Hexagonal Lattices.
DE83048291 14 CP **T03**

MSCAT; Slow Neutron Multiple Scattering Calculations.
DE83048575 60 CP **T12**

PHASER; Phase Shift Cross Section and Polarization Calculations.
DE83048507 49 CP **T03**

GASKET; Thermal Scattering Law Calculation.
DE83048263 10 CP **T09**

FLANGE1; Scattering Law Cross Section Calculation.
DE83048247 7 CP **T09**

GAKER; Inelastic Scattering Cross Section Calculations for Moderators.
DE83048289 14 CP **T03**

NEUTRON SOURCES

EXPN; Analysis of Pulsed Neutron Source Data.
DE83048258 9 CP **T09**

NEUTRON SPECTRA

CAGE;BIRD;SPEC; Time-of-Flight Data Analysis.
DE83048476 43 CP **T11**

PAX03; Harmony-PDQ Cross Section Generation Code.
DE83048426 34 CP **T17**

GAMB1T; Cross Section Generation for Transport Codes.
DE83048547 55 CP **T16**

GAND; GAFGAR Cross-Section Library Preparation.
DE83048345 22 CP **T12**

PHROG; Multi-Group Constant and Fast Spectra Calculations.
DE83048520 51 CP **T16**

NEUTRON TRANSPORT

SCAP; Point Kernel Single or Albedo Scatter.
DE83048933 129 CP **T11**

TACASI; Analysis of Resonance Measurements.
DE83048410 32 CP **T11**

APRFX1; 99-Group DLC-2B Library Group-Collapsing.
DE83048466 41 CP **T09**

TPT01; Two-Dimensional Few-Group Transport with Depletion.
DE83048669 75 CP **T17**

RAFFLE2/MOD2; Monte Carlo Neutron Transport.
DE83048631 69 CP **T16**

RCP01; Monte Carlo Neutron and Photon Transport.
DE83048670 76 CP **T16**

NEUTRON TRANSPORT THEORY

AILMOE; Cross Section Calculation of Elastic Scattering Resonances.
DE83048147 3 CP **T13**

M0648; One-Dimensional Slab Transport with Slowing down.
DE83048342 21 CP **T09**

FESH; X-Y Multi-Group Neutron Transport Method.
DE83048861 114 CP **T11**

2DF; Two-Dimensional, Multigroup Discrete Ordinate Code.
DE83048173 4 CP **T12**

TWOTRAN2; Two-Dimensional, Multigroup Transport in Xy, Rz, and R theta Geometries.
DE83048358 23 CP **T14**

NJOY; Neutron and Photon Cross Sections from ENDF/B.
DE83048883 118 CP **T99**

DTF4; One-Dimensional, Multigroup Discrete Ordinate Program.
DE83048209 6 CP **T11**

BE21; Few-Group, Discrete Ordinates for Slab Geometry.
DE83048398 30 CP **T11**

APARNA2; One-Dimensional Integral Neutron Transport in Slab Geometries.
DE83048878 117 CP **T03**

TSN; Spatially-Dependent Reactor Kinetics.
DE83048309 17 CP **T11**

NEUTRONS

HRG3; Slowing-down Spectrum, Multigroup Constants.
DE83048467 41 CP **T18**

SPAR1; Shielding with Analytic Ray-Tracing.
DE83048823 105 CP **T14**

MOD5; Stochastic Model of Neutron Slowing-down.
DE83048491 46 CP **T12**

MMM3; Coordinate Analyses Semi-Rigid Molecules.
DE83048632 69 CP **T09**

NONLINEAR ALGEBRAIC EQUATIONS

SNEQ; Nonlinear Algebraic Equation Solutions and Curve Plotting.
DE83048364 24 CP **T11**

NONLINEAR DIFFERENTIAL EQUATIONS

LIZARD4; Nonlinear Differential Equations Solution.
DE83048445 37 CP **T11**

MOL1D; Partial Differential Equations Solution.
DE83048834 108 CP **T12**

NONLINEAR PROBLEMS

MINPACK1; Nonlinear Equations and Least Squares.
DE83048888 120 CP **T16**

SNEQ; Nonlinear Algebraic Equation Solutions and Curve Plotting.
DE83048364 24 CP **T11**

OPTIMIZERS; Nonlinear Optimization Subroutines.
DE83048829 107 CP **T13**

NONLINEAR PROGRAMMING

KEELE; Linearly-Constrained Optimization.
DE83048556 57 CP **T09**

NUCLEAR CASCADES

CASIM; Simulates Hadronic Cascade Transport.
DE83048742 89 CP **T13**

NUCLEAR DATA COLLECTIONS

LASL Group-Averaged Cross-Sections; SN 18- 24- and 25-Group Sets.
DE83048532 53 CP **T15**

ETOG1 Data for MUFT and GAM Libraries; MUFT4 or 5, GAM1 or 2.
DE83048447 37 CP **T16**

ETOG3; ENDF/B to MUFT, GAM, ANISN Cross-Section Format.
DE83048538 54 CP **T16**

EDITOR; ENDF/B Tape Processing and Editing.
DE83048502 48 CP **T11**

NUCLEAR FACILITIES

UDAD; Uranium Dispersion and Dosimetry Model.
DE83048824 106 CP **T12**

NUCLEAR FUELS

DBUFIT1; Least Squares Transmutation Analysis.
DE83048456 39 CP **T11**

NUCLEAR FUSION

STEEP4; Thermonuclear Reaction Rates.
DE83048749 91 CP **T11**

NUCLEAR MATERIALS MANAGEMENT

NMMSS; Nuclear Materials Management System.
DE83048695 80 CP **T13**

NUCLEAR POWER PLANTS

OPUS; Power Plant Performance and Price Study.
DE83048226 7 CP **T13**

CONCEPT5;CONCEPT3; Power Plant Conceptual Cost Estimate.
DE83048498 47 CP **T14**

DSNP; Dynamic Simulation Nuclear Power Plants.
DE83048784 98 CP **T16**

XOQDOQ; Nuclear Power Plant Effluent Releases.
DE83048964 136 CP **T11**

HERMES; Regional Radiological Effects Analysis.
DE83048527 52 CP **T14**

OMCOST; Power Plant Non-Fuel Operation and Maintenance Cost Study.
DE83048688 79 CP **T09**

RIO; Power Plant Reliability Characteristics.
DE83048943 131 CP **T13**

PACTOLUS;CLOTHO; Nuclear Power Plant Cost Code.
DE83048540 54 CP **T12**

CRAC; Calculation of Reactor Accident Consequences.
DE83048722 86 CP **T16**

PREMOR; Two-Group Point Reactor Power Plant Model.
DE83048961 135 CP **T13**

PARK1; Nuclear Reactor Power Plant Analysis.
DE83048743 90 CP **T17**

NUCLEAR REACTIONS

POLLA; Converts R-Matrix Resonance Parameters.
DE83048639 71 CP **T03**

ALVIN; Differential-Integral Data Consistency.
DE83048815 104 CP **T15**

HAUSER5; Nuclear Reaction Cross Sections.
DE83048830 107 CP **T13**

NUMBER CODES

3DB; Three-Dimensional Multigroup Diffusion Burnup Analysis.
DE83048567 59 CP **T11**

OPEN-CYCLE MHD GENERATORS

DIFFUSER; Two-Dimensional Subsonic MHD Diffuser Performance.
DE83048737 88 CP **T09**

OPERATING SYSTEMS

COPYCAT; IBM OS System Catalog Utility Routine.
DE83048646 72 CP **T12**

OPERATING SYSTEMS (COMPUTERS)

SLACMON;SLACMON/370; OS360 MVT/MFT Performance Monitor.
DE83048635 70 CP **T13**

OPTICAL LENSES

LENSDES; Nonlinear Least Squares Lens Design System.
DE83048602 64 CP **T11**

OPTIMIZATION

INTEROP; Nonlinear Optimization Algorithms.
DE83048866 115 CP **T12**

MOST; A Multidimensional Optimization Scheme.
DE83048446 37 CP **T03**

OPTIMIZERS; Nonlinear Optimization Subroutines.
DE83048829 107 CP **T13**

OCOPTR;DRVOCR; Unconstrained Optimization.
DE83048753 91 CP **T11**

ARSTEC; Nonlinear Mixed Integer Optimization.
DE83048738 89 CP **T03**

OUTLIERS

PCTEST; Principal Component Test for Outliers.
DE83048769 95 CP **T09**

PARTIAL DIFFERENTIAL EQUATIONS

FORSIM; Solution of Partial or Ordinary Differential Equations.
DE83048514 50 CP **T11**

FFEARS; Laplace Equation Isotropic Dielectrics.
DE83048577 60 CP **T09**

2DEPEP; Elliptic, Parabolic and Eigenvalue Solutions.
DE83048806 102 CP **T09**

DISPL1; One- and Two-Dimensional Kinetics-Diffusion Partial Differential Equations Solution.
DE83048847 110 CP **T14**

PDEONE; Solutions of Partial Differential Equations.
DE83048777 96 CP **T03**

MOL1D; Partial Differential Equations Solution.
DE83048834 108 CP **T12**

PARTICLE TRAJECTORIES

EGUN; Calculation of Electron Trajectories.
DE83048983 139 CP **T11**

PARTICLES

BETTY; Entrained Particles Sampling Study.
DE83048545 55 CP **T03**

TWOTRAN-PNVW; Two-Dimensional Particle Transport X-Y R-Z R-theta.
DE83048573 59 CP **T12**

PARTICULATES

DISPER1; Aerosol Particle Transport Study.
DE83048554 56 CP **T03**

PASSIVE SOLAR HEATING SYSTEMS

PASOLE; Simulation of Passive Solar Systems.
DE83048850 111 CP **T11**

PDP-11 COMPUTERS

UT200; DEC Emulation of CDC 200 User Terminal.
DE83048916 126 CP **T03**

PERSONNEL

SKILLS INVENTORY; Personnel Information System.
DE83048801 101 CP **T11**

PHONONS

COHBE;PREP; Coherent Inelastic Scattering Law Calculations.
DE83048385 28 CP **T03**

PHOTOMULTIPLIERS

DYNO1; Photomultiplier Electron Distribution.
DE83048464 41 CP **T03**

PHOTON CROSS SECTIONS

NJOY; Neutron and Photon Cross Sections from ENDF/B.
DE83048883 118 CP **T99**

PHOTON TRANSPORT

RCP01; Monte Carlo Neutron and Photon Transport.
DE83048670 76 CP **T16**

PHOTOVOLTAIC CONVERSION

SOLCEL2; Simulation of Photovoltaic Systems.
DE83048937 130 CP **T13**

PHOTOVOLTAIC POWER SUPPLIES

STESEP; Solar Total Energy System Evaluation.
DE83048821 105 CP **T09**

PIPE JOINTS

CORTES; Thermal and Mechanical Analysis of Tees.
DE83048759 92 CP **T15**

PIPES

WHAM6; Liquid-Filled Piping System Analysis.
DE83048278 12 CP **T09**

BENDPAC; Stress Analysis of Flanged Pipe Bends.
DE83048980 139 CP **T13**

HAMOC; Fluid Hammer Analysis of Piping System.
DE83048710 84 CP **T11**

M0457;PIPE; Elastic Stress of Piping System.
DE83048329 19 CP **T11**

WHIP1; Structural Deflection Due to Blowdown.
DE83048863 114 CP **T03**

PIRAX2; Simplified Inelastic Piping Analysis.
DE83048735 88 CP **T11**

PSA2; Stress Analysis Multianchor Pipe System.
DE83048542 54 CP **T09**

LUGS; Stress for Integral Attachments to Pipe.
DE83048648 72 CP **T03**

SUPAN; Analysis of Beam-Type Piping Supports.
DE83048842 109 CP **T09**

ELBOW-ORNL; Pipe Stress and Flexibility Calculations.
DE83048650 73 CP **T09**

CURT2; Curved Tubes or Elbows and Attached Pipes.
DE83048750 91 CP **T13**

PLACRE; FEM Inelastic Structural Analysis.
DE83048740 89 CP **T13**

NATRAN2; Fluid Hammer Analysis One-Dimensional and Two-Dimensional Systems.
DE83048719 85 CP **T11**

PIPING SYSTEMS

NATRANSIENT; Fluid Hammer Analysis One-Dimensional Piping.
DE83048718 85 CP **T09**

NAHAMMER; Fluid Hammer Analysis Piping System.
DE83048717 85 CP **T09**

PLOTTERS

PRPLOT; Line Printer Plot Subroutine Package.
DE83048773 96 CP **T12**

GRFPAK; Plot Package for CORTES FEM Programs.
DE83048760 93 CP **T13**

PLOTTING

KAPLPLOT; KAPL CalComp Plotting Routines.
DE83048496 46 CP **T11**

PLUMES

PLETHS; Isopleth-Area Calculations from Single Source.
DE83048591 62 CP **T03**

SULCAL; Model of Sulfur-Chemistry in a Plume.
DE83048788 98 CP **T09**

ATM; Atmospheric Transport and Diffusion Model.
DE83048787 98 CP **T11**

PLUTONIUM

PUBG; Purex Solvent Extraction Process Model.
DE83048959 135 CP **T09**

ISOTAB; Pu Power Output from Mixed Isotopes.
DE83048619 67 CP **T03**

PLUTONIUM 239

DBUFIT1; Least Squares Transmutation Analysis.
DE83048456 39 CP **T11**

PLUTONIUM 242

DBUFIT1; Least Squares Transmutation Analysis.
DE83048456 39 CP **T11**

PLUTONIUM ISOTOPES

BURNUP; Heavy Element Isotopic Burnup Analysis.
DE83048311 17 CP **T12**

POLARIZATION

PHASER; Phase Shift Cross Section and Polarization Calculations.
DE83048507 49 CP **T03**

PMS1; Fast Neutron Polarization Experiment.
DE83048469 42 CP **T09**

POLLUTANTS

ODMOD; Soil-Water Trace-Containment Transport.
DE83048789 99 CP **T11**

RAMP1; Reich-Moore Resolved Region Cross-Sections.
DE83048492 46 CP **T09**

TIMEX; One-Dimensional Time-Dependent Multigroup Discrete Ordinates.
DE83048756 92 CP **T12**

FSDP3; Pointwise Cross Sections from Breit-Wigner Parameters.
DE83048216 6 CP **T09**

SPAN4; a Point-Kernel Shield Evaluation Code.
DE83048462 41 CP **T15**

NAHAMMER; Fluid Hammer Analysis Piping System.
DE83048717 85 CP **T09**

CURIE; Fission Product Inventory Decay History.
DE83048196 5 CP **T09**

INCITE; Thermal Spectra and Multi-Group Constants.
DE83048565 58 CP **T17**

OPTIMIZERS; Nonlinear Optimization Subroutines.
DE83048829 107 CP **T13**

GAMTEC2; Multigroup Constant Calculations for 0 to 10 MeV.
DE83048185 5 CP **T15**

MIRAB;MIRAP; Containment System Iodine Removal.
DE83048499 47 CP **T11**

TOODY2; Two-Dimensional Lagrangian Equations of Motion Solution.
DE83048627 68 CP **T11**

GAMBLE5; Two-Dimensional, Multigroup Diffusion in Xy and Rz Geometry.
DE83048222 7 CP **T14**

BUG2; Two-Dimensional Multigroup Diffusion and Burnup in Xy, Rz Geometries.
DE83048438 36 CP **T15**

GLOVE CHANGE ANALYSIS SYSTEM; Glove Data Base.
DE83048813 104 CP **T11**

DTF4; One-Dimensional, Multigroup Discrete Ordinate Program.
DE83048209 6 CP **T11**

KEELE; Linearly-Constrained Optimization.
DE83048556 57 CP **T09**

GAPER1D; One-Dimensional Transport Perturbation Theory.
DE83048606 65 CP **T11**

HEATING2; Transient Steady-State Heat Transfer.
DE83048198 6 CP **T09**

ANCON; Space-Independent Reactor Kinetics Code.
DE83048486 45 CP **T11**

TRIDENT; Two-Dimensional Multigroup Transport Triangular Mesh.
DE83048741 89 CP **T14**

WAMPUM; Fuel Cycle Costs Performance Study.
DE83048224 7 CP **T09**

ETOG1 Data for MUFT and GAM Libraries; MUFT4 or 5, GAM1 or 2.
DE83048447 37 CP **T16**

COMPARE; Transient Flow in Vented Fluid System.
DE83048702 82 CP **T09**

VARI-QUIR; Time-Dependent, Two-Dimensional, Multigroup Diffusion.
DE83048212 6 CP **T11**

GEM; Analysis of Nuclear Fuel Cycle Economics.
DE83048576 60 CP **T12**

DRIFT; Cooling Tower Drift Eliminator Analysis.
DE83048837 108 CP **T11**

BRT1; Thermal Spectrum Cross Section Calculations.
DE83048184 5 CP **T13**

ADEP; One-Dimensional and Two-Dimensional Few-Group Space-Time Kinetics.
DE83048494 46 CP **T09**

6KILER; Core Heatup Code for BWR/6 Analysis.
DE83048636 70 CP **T09**

OPUS; Power Plant Performance and Price Study.
DE83048226 7 CP **T13**

HRG3; Slowing-down Spectrum, Multigroup Constants.
DE83048467 41 CP **T18**

TRANSPORT; Design of Charged Particle BEAMS.
DE83048791 99 CP **T12**

M0219;FLOT1; PWR Flow Transient Analysis.
DE83048331 20 CP **T11**

TASK; One-Dimensional Multigroup Reactor Kinetics Program.
DE83048558 57 CP **T12**

ORCOST2; Power Plant Capital Cost Estimating.
DE83048588 62 CP **T11**

HAMMER;LITHE;HELP; Critical Analysis System.
DE83048277 12 CP **T15**

CONCEPT5;CONCEPT3; Power Plant Conceptual Cost Estimate.
DE83048498 47 CP **T14**

MARCH1.1; LWR Meltdown Accident Response Model.
DE83048734 88 CP **T14**

CHAINS; Analysis of Radioactive Decay Chains.
DE83048418 33 CP **T03**

ETOG1; ENDF/B to MUFT, GAM, ANISN Cross Sections Format.
DE83048437 36 CP **T14**

GEOCOST-BC; Binary Cycle Geothermal Cost Study.
DE83048711 84 CP **T15**

GEM; Eigenvalue Problem for Vibrating Systems.
DE83048344 22 CP **T11**

U3R; Unresolved Resonance Cross Section Probability Tables.
DE83048553 56 CP **T11**

SYSREL; Reliability Analysis of Series Systems.
DE83048848 110 CP **T03**

GAKER; Inelastic Scattering Cross Section Calculations for Moderators.
DE83048289 14 CP **T03**

BUSHL; Cylindrical Shell Buckling Collapse Analysis.
DE83048481 44 CP **T11**

COMQC; Quality Control Data Analysis Routines.
DE83048649 73 CP **T09**

SUMOR;M0271; S-Wave Neutron Cross Section Calculation.
DE83048399 30 CP **T09**

MOST; A Multidimensional Optimization Scheme.
DE83048446 37 CP **T03**

SPAR1; Shielding with Analytic Ray-Tracing.
DE83048823 105 CP **T14**

GASP7; One-Dimensional Burnup Power Distribution Search.
DE83048319 18 CP **T12**

MACS LATTICE VIBRATION CODES; MACS Lattice Vibration Neutron Scattering Codes.
DE83048574 60 CP **T13**

MONA; One-Dimensional Multigroup Diffusion in Slab, Cylindrical, and Spherical Geometry.
DE83048582 61 CP **T14**

CYGRO2; Stress Analysis of Cylindrical Fuel Elements.
DE83048266 10 CP **T11**

MOD5; Stochastic Model of Neutron Slowing-down.
DE83048491 46 CP **T12**

OCOPTR;DRVOCR; Unconstrained Optimization.
DE83048753 91 CP **T11**

PAX03; Harmony-PDQ Cross Section Generation Code.
DE83048426 34 CP **T17**

DYNO1; Photomultiplier Electron Distribution.
DE83048464 41 CP **T03**

CRAC; Calculation of Reactor Accident Consequences.
DE83048722 86 CP **T16**

M0457;PIPE; Elastic Stress of Piping System.
DE83048329 19 CP **T11**

AMDLIBF; Argonne Subroutine Library Category F.
DE83048563 58 CP **T11**

HAUSER5; Nuclear Reaction Cross Sections.
DE83048830 107 CP **T13**

AVOID; Annular Void Cross Section Calculation.
DE83048276 12 CP **T03**

FRCRL2; LOCA Fission Product Release Analysis.
DE83048500 47 CP **T03**

VARI-1D; One-Dimensional Variational Sensitivity.
DE83048625 68 CP **T14**

CEXE;INCEXE; One-Group, Three-Dimensional Xyz Xenon Oscillation.
DE83048415 32 CP **T09**

HEATMESH; Geometrical Data Heat Transfer Study.
DE83048434 35 CP **T09**

DWG100RQ;DWG101RQ; Convert to or from SI Units.
DE83048812 104 CP **T11**

GANDY3; Unresolved Resonance Cross Section Calculation.
DE83048341 21 CP **T09**

PWR-PPM; Boration-Dilution Tables for PWR Operation.
DE83048552 56 CP **T03**

FUNPACK Release 2; Special Function Routines.
DE83048610 66 CP **T14**

M0555;ACT1; Loss-of-Coolant Accident Analysis.
DE83048284 13 CP **T11**

COMNUC;CASCADE; Compound Nucleus Reaction.
DE83048482 44 CP **T11**

LINEAR;SIGMA1; Linearize and Broaden ENDF/B Data.
DE83048747 90 CP **T09**

BE21; Few-Group, Discrete Ordinates for Slab Geometry.
DE83048398 30 CP **T11**

KENO2;KENO4; Monte Carlo Multigroup Criticality Code.
DE83048450 38 CP **T17**

COMCAN;COMCAN2A; System Safety Common Cause Analysis.
DE83048704 82 CP **T13**

EXPALS; Least Squares Exponential Decay Curves.
DE83048321 18 CP **T09**

TWOTRAN-PNVW; Two-Dimensional Particle Transport X-Y R-Z R-theta.
DE83048573 59 CP **T12**

CONF; Conference Attendee and Speaker Data File.
DE83048838 108 CP **T09**

MUSCAT; View Factor Shielding Code Cavity Geometry.
DE83048259 9 CP **T11**

JOSHUA OPERATING SYSTEM; Data Storage, Retrieval, and Display.
DE83048490 45 CP **T99**

SLACMON;SLACMON/370; OS360 MVT/MFT Performance Monitor.
DE83048635 70 CP **T13**

REDUX; Reactor Fluctuation Experiment Analysis.
DE83048425 34 CP **T03**

PMS1; Fast Neutron Polarization Experiment.
DE83048469 42 CP **T09**

SHOCK; Dynamic Response of Lumped-Mass Systems.
DE83048795 100 CP **T11**

NURLOC-1.0; Loss-of-Coolant Thermal Analysis.
DE83048328 19 CP **T11**

HYMAS; Hydrodynamic Mass Matrix Generation.
DE83048560 57 CP **T09**

AEC-ALO FAU; Radio Frequency Management System.
DE83048587 62 CP **T09**

WHAM6; Liquid-Filled Piping System Analysis.
DE83048278 12 CP **T09**

DUZ2; Two-Dimensional Axisymmetric and Plane Elastic-Plastic Stress Calculations.
DE83048503 48 CP **T16**

RELAP3B/MOD110; Reactor System Transient Code.
DE83048733 88 CP **T15**

GROUSE; Space-Dependent Cross Section Generation.
DE83048420 33 CP **T11**

PWCOST; Reactor Fuel Cycle Cost Calculation.
DE83048441 37 CP **T11**

SPOOL-FIRE; Spray-Pool Burning of Sodium.
DE83048714 84 CP **T09**

TWIGL;TWIGGLE; Two-Dimensional, Two-Group Space-Time Diffusion Feedback.
DE83048338 20 CP **T09**

SHLOG; Data Management, Editing, and Analysis.
DE83048557 57 CP **T14**

DISPL1; One- and Two-Dimensional Kinetics-Diffusion Partial Differential Equations Solution.
DE83048847 110 CP **T14**

M0552; Dynamic Analysis of Linear Elastic Systems.
DE83048283 13 CP **T09**

STEAM-67; 1967 ASME Steam and Water Properties.
DE83048487 45 CP **T11**

COPYCAT; IBM OS System Catalog Utility Routine.
DE83048646 72 CP **T12**

GAPL3; Inelastic Large Deflection Stress Study.
DE83048397 30 CP **T11**

ROPE; Finding Roots of a Polynomial.
DE83048444 37 CP **T09**

ANOVA; Three Factor Analysis of Variance.
DE83048819 105 CP **T09**

GAPOTKIN; Space-Independent Reactor Kinetics.
DE83048317 18 CP **T09**

FFEARS; Laplace Equation Isotropic Dielectrics.
DE83048577 60 CP **T09**

ASTEM; Thermodynamic Properties Water and Steam.
DE83048580 61 CP **T09**

MACH1; One-Dimensional, Multigroup Diffusion in Slabs, Cylinders, and Spheres.
DE83048262 9 CP **T15**

CAGE;BIRD;SPEC; Time-of-Flight Data Analysis.
DE83048476 43 CP **T11**

SOMIX1; Sodium Spray Fires in Cylindrical Cell.
DE83048751 91 CP **T11**

GAZE2; One-Dimensional Multigroup Diffusion in Slab, Spherical, and Cylindrical Geometries.
DE83048430 35 CP **T12**

RESEND;ADLER; ENDF/B Resonance Cross Section Codes.
DE83048465 41 CP **T11**

WFLLL2B; Wire Configuration Frequency Domain.
DE83048721 86 CP **T12**

DAFT1; Least Squares Fit for Fissile Nuclide Data.
DE83048327 19 CP **T03**

RESPOND; Dissimilar Media TLD Correction Calculations.
DE83048566 58 CP **T03**

SOLA-DF; Transient Two-Dimensional Two-Phase Flow.
DE83048832 107 CP **T09**

FIGRO; LWBR Fuel Swelling Temperature Study.
DE83048272 11 CP **T11**

RELO2; Failure Probability Calculation by Monte Carlo.
DE83048497 47 CP **T11**

MMM3; Coordinate Analyses Semi-Rigid Molecules.
DE83048632 69 CP **T09**

MICHRD; Microhardness Measurement Analysis.
DE83048421 33 CP **T09**

BURST1; Hydrodynamic Analysis During Blowdown.
DE83048435 36 CP **T13**

ALVIN; Differential-Integral Data Consistency.
DE83048815 104 CP **T15**

GAND; GAFGAR Cross-Section Library Preparation.
DE83048345 22 CP **T12**

STRIPE;M0650; Fuel Rod Clad Strain and Pellet Cracking.
DE83048570 59 CP **T09**

SPIRAL; Full-Text Storage, Search and Retrieval.
DE83048607 65 CP **T17**

SEALSHELL2;M0110; Shell Stress Analysis for Axisymmetric Loading.
DE83048282 12 CP **T11**

3DXT;DEP3; Three-Dimensional Xenon Transient and Depletion.
DE83048477 43 CP **T14**

PLACRE; FEM Inelastic Structural Analysis.
DE83048740 89 CP **T13**

FLAC; Steady-State Flow, Pressure Distribution.
DE83048395 29 CP **T09**

HAA3B; Aerosol Behavior Lognormal Model.
DE83048443 37 CP **T11**

BEAMCRP; Finite-Element Beam Creep Analysis.
DE83048701 82 CP **T11**

ISOSEARCH; Isotope Production Flux, Cross Section Calculations.
DE83048322 18 CP **T09**

TOKMINA;TOKMINA2; Tokamak Fusion Reactor Study.
DE83048561 57 CP **T03**

GEOCITY; Geothermal District Heating Economics.
DE83048835 108 CP **T14**

RSAC; Radiological Safety Analysis Program.
DE83048265 10 CP **T12**

QX1; Quasistatic Spatial Reactor Kinetics Code.
DE83048474 42 CP **T14**

PROGLOOK; User Program Performance Monitor.
DE83048642 71 CP **T11**

ASPIS; Gamma-Ray Source Buildup Factor Calculations.
DE83048429 34 CP **T11**

3DDT; Three-Dimensional Multigroup Diffusion Xyz or R-theta-Z.
DE83048463 41 CP **T12**

OPTRM; Hydrologic Transport with Optimization.
DE83048794 100 CP **T12**

ECCSA4; Loss-of-Coolant and Emergency Cooling.
DE83048330 20 CP **T11**

VIEWPIN; View Factor Calculations for Cylindrical Pins.
DE83048569 59 CP **T09**

PLETHS; Isopleth-Area Calculations from Single Source.
DE83048591 62 CP **T03**

THREDES; One-Dimensional Few Group Diffusion Design System.
DE83048273 11 CP **T14**

CHIC-KIN; Fast and Intermediate Power Transients.
DE83048473 42 CP **T12**

ARSTEC; Nonlinear Mixed Integer Optimization.
DE83048738 89 CP **T03**

TAC3D; Transient Three-Dimensional Heat Transfer Program.
DE83048414 32 CP **T09**

GSSLRN1B; Least Squares Photopeak Spectra Code.
DE83048457 39 CP **T11**

WIGL3; One-Dimensional Space-Time Diffusion with Feedback.
DE83048708 83 CP **T12**

STEM; Matrix Generation for a System of BEAMS.
DE83048337 20 CP **T03**

BETTY; Entrained Particles Sampling Study.
DE83048545 55 CP **T03**

PASOLE; Simulation of Passive Solar Systems.
DE83048850 111 CP **T11**

HOT2; Two-Dimensional Transient Heat Conduction Program.
DE83048286 13 CP **T14**

CRECT;CHECKER;RIGEL;PLOTFB; LISTFC;DICTION;SLAVE3;DAMMET ENDF/B V2 Processing Codes.
DE83048475 43 CP **T15**

STFODE;COLODE; Collocation Solution of Stiff Ordinary Differential Equations.
DE83048652 73 CP **T09**

WASP2; Water Properties for Safety Analysis.
DE83048396 29 CP **T12**

SAFE-CRACK; Viscoelastic Analysis of Concrete.
DE83048451 38 CP **T11**

STESEP; Solar Total Energy System Evaluation.
DE83048821 105 CP **T09**

GAFGAR;P3T;PROC;TAPCOP; Spectra and Group-Averaged Cross Section Calculation.
DE83048316 17 CP **T12**

GAMB1T; Cross Section Generation for Transport Codes.
DE83048547 55 CP **T16**

PLOTR; Two-Dimensional Contour Plots and Area Calculation.
DE83048578 61 CP **T09**

WATER; Steam Tables at 14.5 to 14,500 Psia and 32 to 472 exp 0 F.
DE83048267 10 CP **T09**

BETTIS ENVIRONMENTAL ROUTINES; MODEL6/3.3;MODEL7/2.0; Modified Bettis Environmental Library Scope 3.3.
DE83048478 43 CP **T15**

GNASH; Particle Induced Cross Sections and Spectra.
DE83048757 92 CP **T11**

GLUB1; Water-Logged Fuel Element Analysis.
DE83048424 33 CP **T11**

VELVET2; Turbulent Flow in LMFBR Rod Bundle.
DE83048458 40 CP **T11**

RICE-LASL; Chemically Reactive Mixture Flow.
DE83048720 86 CP **T11**

SAFE-3D; Three-Dimensional Composite Structure Stress Study.
DE83048332 20 CP **T12**

WSP-HASP/DOS; DOS-MFT Remote Workstation Package.
DE83048541 54 CP **T09**

PHOS1; pH and Conductivity of Sodium Phosphate Solutions.
DE83048826 106 CP **T03**

PDQ8;PDQ7; One-, Two-, or Three-Dimensional, Few Group Diffusion Depletion.
DE83048275 11 CP **T99**

GAPER2D; Two-Dimensional Perturbation Calculation from 2DF Output.
DE83048471 42 CP **T11**

ORRIBLE; Rod Bundle Flow and Temperature Distribution.
DE83048629 69 CP **T12**

ALPHA-M; Resolution of gamma-Ray Spectra.
DE83048413 32 CP **T09**

SHELL5; Thin Shell Three-Dimensional Structural Analysis.
DE83048452 39 CP **T11**

CREEP-PLAST2; Two-Dimensional Inelastic Structural Analysis.
DE83048810 103 CP **T13**

M0756;LETO; One-Dimensional Slab gamma-Ray Transport.
DE83048343 21 CP **T11**

ENDF/B-THERMOS; 30-Group ENDF/B Scattering Kernels.
DE83048543 54 CP **T14**

NRTS ENVIRONMENTAL SUBROUTINES; FORTRAN Utilities.
DE83048613 66 CP **T16**

GASA (GA Stability Analysis); Stability Analysis for Reactor Kinetic Equations.
DE83048290 14 CP **T09**

FREADM1; Fast Reactor Core Accident Analysis.
DE83048479 43 CP **T13**

CORRAL2; Radionuclide Containment after LOCA.
DE83048745 90 CP **T11**

SAS1A; Fast Reactor Power and Flow Transients.
DE83048400 30 CP **T13**

PHENIX; Two-Dimensional Diffusion Burnup Refueling History.
DE83048454 39 CP **T11**

ORSIM; Optimizing Utility Generation Planning.
DE83048699 81 CP **T12**

CINDER;M0102; Point Depletion Fission Product.
DE83048313 17 CP **T11**

EMERALD REVISION 1; PWR Accident Activity Release.
DE83048546 55 CP **T13**

SUPAN; Analysis of Beam-Type Piping Supports.
DE83048842 109 CP **T09**

EXPN; Analysis of Pulsed Neutron Source Data.
DE83048258 9 CP **T09**

GRAMP; Reich-Moore Parameters of Unresolved Resonances.
DE83048470 42 CP **T03**

POLLA; Converts R-Matrix Resonance Parameters.
DE83048639 71 CP **T03**

SUPERTOG; ENDF/B Fine-Group Constants Generation.
DE83048431 35 CP **T14**

DBUFIT1; Least Squares Transmutation Analysis.
DE83048456 39 CP **T11**

MSF21;VTE21; Desalination Plant Optimization.
DE83048798 100 CP **T12**

AIROS2A; Simulation of Reactor Dynamics.
DE83048326 19 CP **T12**

PLOT-3D; Three-Dimensional Plots on IBM2280 or CalComp780.
DE83048544 55 CP **T09**

TRIAL; Three-Dimensional Reaction Rates from Two-Dimensional Flux Sets.
DE83048585 62 CP **T09**

LEOPARD;SPOTS; Spectrum Calculations with Depletion.
DE83048279 12 CP **T12**

ERREST; Loss of Coolant Rod Bundle Critical Heat Flux Data Analysis.
DE83048518 50 CP **T13**

BIOSSIM; Biochemical Kinetic Simulation System.
DE83048736 88 CP **T14**

DOS; Neutron Flux-Dosimeter Activity Relation.
DE83048423 33 CP **T03**

DOT2DB; Two-Dimensional Multigroup Diffusion and SN Theory.
DE83048459 40 CP **T12**

THI3D; Thermal-Hydraulic Multichannel Analysis.
DE83048706 83 CP **T13**

M0648; One-Dimensional Slab Transport with Slowing down.
DE83048342 21 CP **T09**

CEBUG; Steam Generator Sodium-Water Reaction.
DE83048548 55 CP **T09**

FUELS DATA; Model Verification Fuel Rod Data.
DE83048844 110 CP **T18**

BISYN; Two-Dimensional, Multigroup Diffusion Synthesis Calculations.
DE83048287 13 CP **T15**

HERMES; Regional Radiological Effects Analysis.
DE83048527 52 CP **T14**

DYNAMIC ANALYSIS OF GASES; Dynamic Analysis of Gases by Mass Spectrometry.
DE83048645 72 CP **T03**

SORSDB; Pressure Vessel Stress and Fatigue.
DE83048391 29 CP **T03**

DAC1; SN Perturbation Code Using DTF4 Fluxes.
DE83048455 39 CP **T09**

COVE1; Creep Collapse for Oval Fuel Pin Tube.
DE83048817 105 CP **T11**

TEMCO7; Temperature Coefficient Calculation.
DE83048320 18 CP **T12**

PSA2; Stress Analysis Multianchor Pipe System.
DE83048542 54 CP **T09**

ERF;ERFC; Error and Complementary Error Function.
DE83048601 64 CP **T03**

GASKET; Thermal Scattering Law Calculation.
DE83048263 10 CP **T09**

ARC-NUI002 BCD Input Processor; BCD Input Data Processing Module.
DE83048533 53 CP **T14**

CURT2; Curved Tubes or Elbows and Attached Pipes.
DE83048750 91 CP **T13**

DOGGY; Desk Calculator Form Sheet DP Package.
DE83048428 34 CP **T11**

RICE; Primary Recoil Atom Spectra ENDF/B Data.
DE83048453 39 CP **T11**

NATRAN2; Fluid Hammer Analysis One-Dimensional and Two-Dimensional Systems.
DE83048719 85 CP **T11**

2DB; Two-Dimensional Multigroup Diffusion and Depletion.
DE83048325 19 CP **T11**

GENED ENVIRONMENTAL ROUTINES; Subroutine Library.
DE83048515 50 CP **T09**

SWAP9; Stress-Wave Analysis in One-Dimensional Strain.
DE83048828 106 CP **T11**

WIGL2; One-Dimensional, Two-Group Space-Time Diffusion.
DE83048274 11 CP **T12**

LIFE3; Mixed-Oxide Fuel Element Performance.
DE83048460 40 CP **T12**

GRAPH; Linear Regression with Confidence Limits.
DE83048624 68 CP **T12**

ATHENA4; Inelastic Scattering Form Factors.
DE83048417 33 CP **T11**

CLUP77; Square Cell Collision Probability Calculations.
DE83048526 52 CP **T11**

COMB; One-Dimensional High-Temperature Coal Combustor Model.
DE83048811 103 CP **T09**

POWERCO; Nuclear Station Electricity Costs.
DE83048340 21 CP **T03**

M0678;FUGIT1; Dynamic Response of Elastic Structures.
DE83048537 53 CP **T09**

INDX; X-Ray Diffraction Powder Pattern Indexing.
DE83048609 65 CP **T09**

RESQ2;RESQ0;DBFL; Resonance Integral for a Hexagonal Cell.
DE83048285 13 CP **T13**

HEATING5;HEATING3; One-, Two-, or Three-Dimensional Heat Conduction Program.
DE83048517 50 CP **T11**

DRAFTMAN; Draw Figures and Graphs with DISSPLA.
DE83048748 90 CP **T09**

JITER; Fluctuation Experiment Analysis.
DE83048394 29 CP **T09**

BESFIT; Diffraction Model Elastic Scattering Cross Sections.
DE83048524 52 CP **T09**

F0355; Shaper Cutter Contour Generator.
DE83048697 81 CP **T03**

FRANTIC; Least Squares Fit Sum of Exponentials.
DE83048324 19 CP **T09**

ETOG3; ENDF/B to MUFT, GAM, ANISN Cross-Section Format.
DE83048538 54 CP **T16**

TRAC-PD2/MOD1; Best-Estimate Analysis PWR LOCA.
DE83048836 108 CP **T99**

CAESAR4; LIBLST; One-Dimensional, Multigroup Diffusion.
DE83048270 10 CP **T15**

PTAC11; 2-Pass Assembler for the PDP-11 on 360.
DE83048516 50 CP **T09**

NUBOW; Structural Analysis Bowed Reactor Cores.
DE83048643 71 CP **T09**

FARED; One-Dimensional Fast Reactor Design and Survey Study.
DE83048427 34 CP **T17**

SOCOOL2; Sodium-Fuel Interaction Analysis.
DE83048521 51 CP **T09**

EVITS; Steady State Two-Dimensional Fluid Flow.
DE83048792 99 CP **T09**

TOAD; Processing of Analyzer gamma-Ray Spectra.
DE83048333 20 CP **T11**

MULTI; Multi-Level Resonance Theory Cross-Section Calculations.
DE83048535 53 CP **T03**

FPFM; Steady-State Fission Product Fuel Model.
DE83048584 61 CP **T09**

CLIP; FORM Or THREDES Library Utility Routine.
DE83048271 10 CP **T13**

NRTS OS/360 Remote Job Entry; OS/360 MVT Remote Job Entry System.
DE83048519 51 CP **T19**

LOCK; Few-Channel Coolant-Flow Blockage Study.
DE83048732 88 CP **T11**

PARTI; Optimal Group or Mesh Collapsing.
DE83048416 33 CP **T03**

PREP;KITT; System Fault Tree Evaluation Codes.
DE83048528 52 CP **T11**

HAMOC; Fluid Hammer Analysis of Piping System.
DE83048710 84 CP **T11**

CODILLI; Least Squares Analysis of Resonance Data.
DE83048347 22 CP **T09**

CLEM; Angular Distribution Legendre Fitting.
DE83048531 53 CP **T09**

RANDOM NUMBERS; Obtained from U235 alpha Decay.
DE83048843 109 CP **T99**

HEXSCAT; Elastic Scattering Cross Sections Hexagonal Lattices.
DE83048291 14 CP **T03**

THETA1B; Fuel Rod Thermal Response Loss of Coolant Accidents.
DE83048512 50 CP **T16**

LUGS; Stress for Integral Attachments to Pipe.
DE83048648 72 CP **T03**

LARCA; Flux-Weighting of DTF4 Cross Sections.
DE83048409 32 CP **T09**

ESP; Monte Carlo Reactor Analysis Calculation.
DE83048523 51 CP **T16**

MESA; Maximum Entropy Time Series Analysis.
DE83048825 106 CP **T11**

FEVER7; One-Dimensional Multigroup Diffusion and Depletion.
DE83048318 18 CP **T12**

GENRD; Free-Format Card Input Processor.
DE83048530 53 CP **T09**

EGAD; Calculations of External gamma Dose Integrals.
DE83048600 64 CP **T03**

GADOSE;DOSET; HTGR Accident Analysis Dose Calculations.
DE83048261 9 CP **T12**

FORSIM; Solution of Partial or Ordinary Differential Equations.
DE83048514 50 CP **T11**

DEMONR; Unbiased Monte Carlo Slab Shield Code.
DE83048754 91 CP **T09**

COBRA4I; Rod Bundle and Core Thermal-Hydraulics.
DE83048432 35 CP **T13**

ARC-SYSTEM; System Subprograms and Modules.
DE83048522 51 CP **T12**

SOLA-ICE; Transient Compressible Fluid Flow.
DE83048723 86 CP **T03**

GAUGE; Two-Dimensional, Few-Group, Neutron Diffusion in Hexagonal Geometries.
DE83048339 21 CP **T12**

STRAP; Static and Dynamic Structural Analysis.
DE83048539 54 CP **T14**

BECKDRY; Dry Cooling for Steam-Electric Plants.
DE83048833 107 CP **T12**

M0807; Two-Dimensional Diffusion Absorption Removal Cross Sections.
DE83048280 12 CP **T09**

PHROG; Multi-Group Constant and Fast Spectra Calculations.
DE83048520 51 CP **T16**

LANL-J501; SC-4020 Emulation Graphics Library.
DE83048633 69 CP **T13**

SABOR4; Discrete-Element Analysis of Thin Shells.
DE83048402 30 CP **T12**

ORTHIS;ORTHAT; Two-Dimensional Heat Conduction.
DE83048525 52 CP **T14**

DPOLE; Helmholtz Equation on General Three-Dimensional Region.
DE83048816 104 CP **T11**

FREVAP6; HTGR Metallic Fission Product Release.
DE83048301 15 CP **T09**

RAHAB Lattice Physics Modules; JOSHUA System Lattice Physics Modules.
DE83048536 53 CP **T15**

TRIPLET; Two-Dimensional Triangular Mesh Transport Program.
DE83048608 65 CP **T14**

M0899;HOH; Steam Tables 14.5-2538 Psia.
DE83048294 14 CP **T09**

VIM1;VIM1X; Monte Carlo Critical Assembly Analysis.
DE83048510 49 CP **T99**

PARK1; Nuclear Reactor Power Plant Analysis.
DE83048743 90 CP **T17**

FINEL; Finite-Element Study in Two- and Three-Dimensonal Structures.
DE83048404 31 CP **T09**

LASL Group-Averaged Cross-Sections; SN 18- 24- and 25-Group Sets.
DE83048532 53 CP **T15**

EPISODEB; Solve Ordinary Differential Equations Systems with Banded Jacobian.
DE83048705 83 CP **T11**

JUPITOR1;JP1; Coupled Channel Cross Section Evaluation.
DE83048308 16 CP **T12**

PHASER; Phase Shift Cross Section and Polarization Calculations.
DE83048507 49 CP **T03**

MOL1D; Partial Differential Equations Solution.
DE83048834 108 CP **T12**

GGC4; Multigroup Cross Sections Fast Thermal Spectra.
DE83048298 15 CP **T15**

PACTOLUS;CLOTHO; Nuclear Power Plant Cost Code.
DE83048540 54 CP **T12**

RIGEL4;CHECK4;SUMUP4;LISTF4; PLOTF4;RESEND;CRECT;DICT4;CAREN4 ENDF/B V4 Processing Codes.
DE83048638 70 CP **T15**

TAC2D; Steady-State and Transient Temperature Calculations.
DE83048408 31 CP **T14**

THRES2; Statistical Model Reaction Cross Sections.
DE83048504 48 CP **T09**

CHART; Iodine Decay Heat on Charcoal Adsorbers.
DE83048804 102 CP **T11**

HWOCR-SAFE; Two-Dimensional Monte Carlo Cell Calculation.
DE83048307 16 CP **T12**

ANVENT; Los of Coolant Analysis Duke Power McGuire Units.
DE83048529 52 CP **T03**

STEFEG; Analysis of PWR and BWR Gaseous Release.
DE83048583 61 CP **T09**

PSEUDO; Statistical Resonance Parameter Calculations.
DE83048292 14 CP **T03**

JP1XR; Coupled-Channel Scattering Cross Section Calculations.
DE83048506 49 CP **T11**

PRP; Product Price Calculated by DCF Method.
DE83048739 89 CP **T09**

TACASI; Analysis of Resonance Measurements.
DE83048410 32 CP **T11**

TDOWN; Spatial and Composition-Dependent Cross Sections.
DE83048505 48 CP **T99**

IMPAC2; Edition B; Shipping Container Impact Analysis.
DE83048715 85 CP **T09**

TSN; Spatially-Dependent Reactor Kinetics.
DE83048309 17 CP **T11**

ETOT2; Thermal Libraries from ENDF/B Data.
DE83048509 49 CP **T12**

MINX; Multigroup Cross Sections from ENDF/B-IV Data.
DE83048851 111 CP **T17**

LION4;LION; Three-Dimensional Temperature Distribution Program.
DE83048299 15 CP **T11**

MUCHA1;MUCHA2; Multiple Channel Analysis Emergency Core Cooling.
DE83048508 49 CP **T13**

SLOP;CROSS; IBM 360 FORTRAN H Program Checker.
DE83048647 72 CP **T09**

GAMTRI; Two-Dimensional, Multigroup, Diffusion Triangular Mesh Geometries.
DE83048401 30 CP **T14**

VENUS2; Two-Dimensional Coupled Neutronics-Hydrodynamics.
DE83048511 49 CP **T11**

SCHAFF; Heat and Water Transfer in Porous Media.
DE83048802 101 CP **T11**

BLOOST6; Combined Kinetics Two-Dimensional Heat Transfer.
DE83048303 16 CP **T13**

VUGRAPH; Plots Presentation-Quality Viewgraphs.
DE83048884 119 CP **T03**

TOPLYR2; Power Plant Thermal Discharge Study.
DE83048599 64 CP **T11**

GRDWRK; Grid Generation for Safe Programs.
DE83048296 14 CP **T09**

RAFFLE; First Flight Collision Probabilities for Multiple-Cell Geometries.
XE83048392 142 CP **T11**

STEEP4; Thermonuclear Reaction Rates.
DE83048749 91 CP **T11**

DATATRAN2 Utility Plotting Modules; Utility Plot Modules F(X) and F(X,Y).
DE83048407 31 CP **T12**

STOPS; Power System Short-Term Optimization.
DE83048958 134 CP **T09**

SPRAY3; Sodium Spray Release Safety Analysis.
DE83048716 85 CP **T09**

SAFE-CREEP; Viscoelastic Analysis of Concrete.
DE83048300 15 CP **T09**

ANALYZE; Hydrothermal Reservoir Test Analysis.
DE83048891 120 CP **T09**

FASTCAR; Solution of Cauchy-Riemann Equations.
DE83048827 106 CP **T09**

FLASH3; Loss-of-Coolant Accident Analysis.
DE83048295 14 CP **T13**

L2RMAT; Coupled Channel Inelastic Scattering.
DE83048987 140 CP **T11**

LATIN SQ; N X N Latin Square Experimental Design.
DE83048630 69 CP **T11**

M0661;M0657;M0626; Polynomial Curve Fitting.
DE83048411 32 CP **T11**

BECOM-BNL; Buildings Energy Optimization Model.
DE83048949 132 CP **T13**

SKILLS INVENTORY; Personnel Information System.
DE83048801 101 CP **T11**

GAKIN2; 10 Multigroup, Time-Dependent Diffusion.
DE83048310 17 CP **T11**

COAST4; Costing and Sizing of Tokamak Reactors.
DE83048873 116 CP **T13**

SPEAKEASY MU+ Level; Language Processor Tso or Batch.
DE83048593 63 CP **T99**

CITATION; One-, Two-, and Three-Dimensional Diffusion Depletion Using Multigroup Theory.
DE83048387 28 CP **T16**

ARC-DIF1D; One-Dimensional Multigroup Diffusion and Inventory.
DE83948626 142 CP **T16**

K-FIX; Transient Two-Dimensional Two-Phase Flow.
DE83048727 87 CP **T11**

DATATRAN2 RAD1 Geometry Modules; Radial Geometry Modules for Two-Dimensional Input.
DE83048406 31 CP **T14**

ORTEP2; Crystal Structure Illustration Plots.
DE83048938 131 CP **T12**

MELT3; Fast Reactor Transient Overpower Study.
DE83048700 81 CP **T14**

FCC4; Fundamental Mode Fast Reactor Cross Section Calculations.
DE83048306 16 CP **T11**

APARNA2; One-Dimensional Integral Neutron Transport in Slab Geometries.
DE83048878 117 CP **T03**

REFCO8; Discounted Cash Flow Fuel Cycle Cost.
DE83048855 112 CP **T15**

ISOGEN; Radionuclide Generation and Decay.
DE83048367 24 CP **T11**

SPXCPL; Two-Dimensional Modeling of Self-Potential Effects.
DE83048985 140 CP **T09**

REBUS2; Fuel Cycle Analysis for Fast Reactors.
DE83048634 69 CP **T99**

NOAH; One-Dimensional, One-Group Space-Time Diffusion Feedback.
DE83048405 31 CP **T11**

ABCRR;ABCRRJ; A+ BC Classical Trajectory Study.
DE83048955 134 CP **T11**

2DEPEP; Elliptic, Parabolic and Eigenvalue Solutions.
DE83048806 102 CP **T09**

BURNUP; Heavy Element Isotopic Burnup Analysis.
DE83048311 17 CP **T12**

SHAFT79; Two-Phase Geothermal Reservoir Model.
DE83048893 121 CP **T16**

LENSDES; Nonlinear Least Squares Lens Design System.
DE83048602 64 CP **T11**

SCORE3; SCISRS ENDF/B Graphic Cross Section Evaluation.
DE83048375 26 CP **T19**

LADTAP2; Liquid Pathway Dose Calculations.
DE83048992 141 CP **T11**

HETRAP; Fuel Rod Response LOCA Experiments.
DE83048730 87 CP **T09**

MANE1; Rectangular Magnetic Network Solution.
DE83048412 32 CP **T09**

SATDSK; Saturated Iron Magnetic Field Study.
DE83048944 131 CP **T09**

CREEP-PLAST; Two-Dimensional Inelastic Structural Analysis.
DE83048707 83 CP **T13**

PERT4; Two-Dimensional Perturbation in Xy, Rz, and R-theta Geometry.
DE83048304 16 CP **T09**

TSOAK-M1; Analysis of Fusion Detritiation Data.
DE83048875 117 CP **T12**

PROMSYS; Programmed Equipment Maintenance.
DE83048846 110 CP **T12**

CHECKER;CRECT;DAMMET;PLOTFB; SLAVE3 ENDF/B V1 Processing Codes.
DE83048384 27 CP **T14**

PELSHIE2; Point Kernel Integration Shielding.
DE83048984 140 CP **T11**

MOCUS; Minimal Sets from Fault Trees.
DE83048653 73 CP **T11**

GAFFE; Equilibrium Fuel Cycle Calculation.
DE83048302 16 CP **T11**

INSCAT; Inelastic Scattering Method.
DE83048940 131 CP **T11**

DOPSEL; Self-Shielding in the Resonance Region.
DE83048805 102 CP **T11**

WELWING; Material Buckling of Cylindrical Fuel Elements.
DE83048362 24 CP **T09**

ELEFUNT; Tests of FORTRAN Elementary Functions.
DE83048881 118 CP **T11**

MATUS;MESH3D;APACHE; Three-Dimensional Finite-Element Elastic Analysis.
DE83048597 63 CP **T16**

AVERAGE; Unresolved Region Average Cross Section Calculations.
DE83048376 26 CP **T03**

CLAP; Linear Control System Design Analysis.
DE83048995 142 CP **T03**

DYNDSK; Optimal Disk Data Set Reordering.
DE83048729 87 CP **T09**

ETOX3; Multigroup Constants from ENDF/B for One Dimension.
DE83048388 28 CP **T13**

ABCD; Atom-Triatom Nonreactive Collisions.
DE83048954 133 CP **T09**

SOLSYS; Solar Energy System Simulation Program.
DE83048692 80 CP **T99**

GAKIT; One-Dimensional, Multigroup Kinetics with Temperature Feedback.
DE83048370 25 CP **T13**

TERZAGI; Isothermal Fluid Flow and Subsidence.
DE83048894 121 CP **T12**

HEXEREI2; HTGR Thermal-Hydraulic Analysis.
DE83048852 111 CP **T15**

TUBE; U-Tube Heat Exchanger Stress Analysis.
DE83048378 26 CP **T09**

XERROR; Fortran Library Error-Handling Package.
DE83048988 140 CP **T09**

GROUP2; Group Theory of Lattice Dynamics.
DE83048620 67 CP **T11**

RAPP; High-Velocity Flow Study of Steam-Water Mixtures.
DE83048382 27 CP **T03**

CPDREV; Spare Parts Inventory Control System.
DE83048947 132 CP **T99**

LINPACK; Simultaneous Linear Algebraic Equations.
DE83048800 101 CP **T15**

RELAP4/MOD6; Transient Thermal-Hydraulic Study.
DE83048369 25 CP **T99**

BNWIGL;UNIWIGL; Two-Group Time-Dependent, One-Dimensional Diffusion.
DE83048870 115 CP **T15**

PELEN; Fuel Pellet Temperature and Deformation.
DE83048598 64 CP **T12**

1DX; One-Dimensional Diffusion Fast Cross Section Generation.
DE83048374 26 CP **T13**

FCHART/SLR2.0; Solar Heating System Performance.
DE83048991 141 CP **T11**

JCLCROSS; DSN Cross-Reference List from JCL PROCLIBS.
DE83048725 86 CP **T09**

DATATRAN2; Modular Programming and Data System.
DE83048386 28 CP **T15**

LOGD; Multichannel LOG-Derivative Scattering.
DE83048941 131 CP **T11**

NIXLIN; Least Squares Fit to Nonlinear Forms.
DE83048709 84 CP **T03**

FLANGE2/71-1; ENDF/B Thermal Scattering Data.
DE83048368 24 CP **T11**

SWAAM1; LMFBR Sodium-Water Reaction Analysis.
DE83048885 119 CP **T15**

TIDY3;TIDY4; Utility to Edit FORTRAN Source Programs.
DE83048857 113 CP **T12**

SIGPLOT; Resolved Multilevel Briet-Wigner Cross Section Calculations.
DE83048377 26 CP **T09**

ELLIPTIC; Elliptic Integrals by Duplication.
DE83048986 140 CP **T09**

GETCOR;FRECOR; FORTRAN Dynamic Storage Allocation.
DE83048644 71 CP **T09**

M0266; Linear Elastic Structural Dynamics.
DE83048383 27 CP **T09**

PICES; Utility Static Generation Reliability.
DE83048957 134 CP **T11**

SLACKLY; One-Dimensional Multicavity Klystron Tube Analysis.
DE83048807 102 CP **T11**

NOWIG; One-Dimensional, Two-Group Kinetics with Temperature Feedback.
DE83048371 25 CP **T09**

CCC; One-Phase Conduction Convection Compaction.
DE83048892 121 CP **T11**

MAPPER-GEPI; Predicting Equipment Requirements.
DE83048595 63 CP **T03**

SAFE-2D; Plane and Axisymmetric Stress Analysis.
DE83048379 27 CP **T11**

IP2D.REV1; Resistivity and Induced-Polarization.
DE83048990 141 CP **T12**

MOBY; Mobile Home Heating and Cooling Energy Use.
DE83048724 86 CP **T09**

STINT3; Single-Channel Space-Time Synthesis.
DE83048389 28 CP **T09**

FLOCHT; Computer Drawn Flow Charts and Diagrams.
DE83048946 132 CP **T12**

FRAPCON2;FRAP-S3;FRAP-S1; Steady State Analysis Oxide Fuel Rods.
DE83048694 80 CP **T16**

SNEQ; Nonlinear Algebraic Equation Solutions and Curve Plotting.
DE83048364 24 CP **T11**

SANDIA-ORIGEN; Isotope Generation and Depletion.
DE83048874 117 CP **T13**

APACHE; Two-Dimensional Chemically Reactive Fluid Flow Code.
DE83048858 113 CP **T13**

BL47; Drafting Tool to Plot Plane Structures.
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EGUN; Calculation of Electron Trajectories.
DE83048983 139 CP **T11**

BH99; Extreme Value Distribution Data Analysis.
DE83048621 67 CP **T09**

COHBE;PREP; Coherent Inelastic Scattering Law Calculations.
DE83048385 28 CP **T03**

LCURVE; Learning Curve Production Calculations.
DE83048936 130 CP **T03**

TDIST2; Community Energy Consumption Analysis.
DE83048799 101 CP **T11**

BLAST; Reactor Kinetics Temperature Distribution Study.
DE83048363 24 CP **T03**

NJOY; Neutron and Photon Cross Sections from ENDF/B.
DE83048883 118 CP **T99**

TCB01; Creep-Buckling of Tubes under Pressure.
DE83048604 65 CP **T09**

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INGEN; Finite Element Program Mesh Generator.
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SUPORT; Solution of Boundary-Value Problems.
DE83048731 87 CP **T11**

GATT; Three-Dimensional, Few-Group Diffusion Calculations in Hexagonal Geometries.
DE83048380 27 CP **T11**

CONSEPT; Controller-Run Solvent Extraction.
DE83048956 134 CP **T09**

NMMSS; Nuclear Materials Management System.
DE83048695 80 CP **T13**

RAPFU; Fuel Cycle Parameters for Fast Breeders.
DE83048372 25 CP **T09**

MINPACK1; Nonlinear Equations and Least Squares.
DE83048888 120 CP **T16**

ANSDDF; ANSI Data Description File Utilities.
DE83048856 113 CP **T11**

TWOTRAN2; Two-Dimensional, Multigroup Transport in Xy, Rz, and R theta Geometries.
DE83048358 23 CP **T14**

PLANMAP.REV1; Plots Geochemical Data in Plan.
DE83048981 139 CP **T09**

KEFF;MGBS;TGAN; Nuclear Criticality Safety.
DE83048617 67 CP **T12**

CORGAM; Unfolding of Complex gamma-Ray Spectra.
DE83048390 29 CP **T09**

ADVCON; Advance Control 93 APT Postprocessor.
DE83048950 133 CP **T11**

BASIC2 INTERPRETER; Minimal Basic Language.
DE83048803 101 CP **T13**

TOR; Thermal Scattering for Crystalline Materials.
DE83048360 23 CP **T11**

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DE83048876 117 CP **T11**

ENDFB2;GAND2;GFE2; ENDF/B to GAFGAR Cross Sections.
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ZPR-III Assembly 48 GAFGAR ENDF/B Data Tapes.
DE83048356 23 CP **T14**

ICOP; Financial Model Industrial Cogeneration.
DE83048971 137 CP **T09**

NAIAD; Compressible Two-Phase Coolant Behavior.
DE83048726 87 CP **T15**

MC-2; Fast Neutron Spectra and Multigroup Cross Sections.
DE83048355 23 CP **T99**

IDAP; Interactive Decision Analysis Procedure.
DE83048935 130 CP **T15**

LASIP3; CCCC Standard Interface File Processor.
DE83048691 80 CP **T13**

GLEN; Group Constant Calculations from TOR Output Data.
DE83048361 24 CP **T11**

ACSAP; Resonance Region Cross Section Analysis.
DE83048880 118 CP **T12**

TDIST3; Community Energy Consumption Analysis.
DE83048854 112 CP **T11**

PUN1; Unresolved Resonance Integral Cross Sections.
DE83048359 23 CP **T09**

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DE83048989 141 CP **T11**

HISTOGRAMS; Quality Control Sample Statistics.
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RAUMZEIT; One-Dimensional Time-Dependent Diffusion Calculations.
DE83048352 22 CP **T09**

OKUMA; OKUMA Two-Axis Lathe APT Postprocessor.
DE83048953 133 CP **T12**

WHTM; Wisconsin Hydrologic Transport Model.
DE83048808 103 CP **T12**

CINCAS; Nuclear Fuel Cycle Cost and Economics.
DE83048354 22 CP **T10**

WELBORE; Transient Wellbore Fluid Flow Model.
DE83048895 121 CP **T09**

ARC-XSEC1; Microscopic Cross Section Manipulation.
DE83048594 63 CP **T13**

SLUMB.REV0; One-Dimensional Schlumberger Inversion Program.
DE83048978 138 CP **T09**

SLIDES; For DISSPLA-Lettered Slides and Posters.
DE83048728 87 CP **T09**

SOLA-VOF; Transient Fluid Flow Free Boundaries.
DE83048948 132 CP **T11**

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DE83048693 80 CP **T15**

THERPP; Thermodynamic Properties of Hydrocarbons.
DE83048869 115 CP **T09**

SOLA-LOOP; Two-Phase Flow Network Analysis.
DE83048859 113 CP **T11**

SECTION.REV1; Plot Geochemical Drill Hole Data.
DE83048977 138 CP **T09**

GAUSS6; Batch Analysis of Gamma-Ray Spectra.
DE83048622 68 CP **T15**

SOLCEL2; Simulation of Photovoltaic Systems.
DE83048937 130 CP **T13**

REFLUX; LWR Reflood Heat Transfer Prediction.
DE83048763 93 CP **T09**

EQ3/6; Chemical Equilibrium of Aqueous Systems.
DE83048886 119 CP **T15**

GAUSS5; Analysis of gamma-Ray Spectra Ge(Li).
DE83048605 65 CP **T14**

NJE; VAX-VMS IBM NJE Network Protocol Emulator.
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SURGTANK; Reactor Steam Surge Tank Dynamics.
DE83048853 112 CP **T11**

BXAMER; Hustler Two-Axis Lathe APT Postprocessor.
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DE83048771 95 CP **T14**

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DE83048979 138 CP **T99**

ISOTAB; Pu Power Output from Mixed Isotopes.
DE83048619 67 CP **T03**

RIO; Power Plant Reliability Characteristics.
DE83048943 131 CP **T13**

DSNP; Dynamic Simulation Nuclear Power Plants.
DE83048784 98 CP **T16**

PECS3; Probabilistic Evaluation Cladding Life.
DE83048868 115 CP **T11**

TPT01; Two-Dimensional Few-Group Transport with Depletion.
DE83048669 75 CP **T17**

GCFM5.0; Geothermal Field and Power Plant Costs.
DE83048976 138 CP **T14**

ZONE; Two-Dimensional Finite Element Mesh Generator.
DE83048765 94 CP **T11**

MNN; Solution of Close Coupling Equations.
DE83048942 131 CP **T12**

SEPHIS/MOD4; Solvent Extraction Simulation.
DE83048690 79 CP **T11**

SAMPLE; Monte Carlo Uncertainty Analysis Code.
DE83048879 117 CP **T03**

BEHAVE-SST; Overpower Transient Fuel Mechanics.
DE83048768 95 CP **T15**

NONSAP-C; Nonlinear Stress Concrete Structures.
DE83048974 137 CP **T15**

GAPCON-THERMAL2 Rev. 1; Fuel Rod Thermal Performance.
DE83048618 67 CP **T12**

PUBG; Purex Solvent Extraction Process Model.
DE83048959 135 CP **T09**

ATM; Atmospheric Transport and Diffusion Model.
DE83048787 98 CP **T11**

RAS; Reliability Analysis for Phased Missions.
DE83048889 120 CP **T14**

MORTRAN2; Macro-Based Structured FORTRAN.
DE83048678 77 CP **T12**

BENDPAC; Stress Analysis of Flanged Pipe Bends.
DE83048980 139 CP **T13**

SOERP; Second-Order Error Propagation Code.
DE83048764 94 CP **T03**

PTTOPT; Point-to-Point Tool APT Postprocessor.
DE83048951 133 CP **T11**

FLANGE-ORNL; Analysis of Flanged Joints.
DE83048689 79 CP **T09**

K-FIX;3D; Three-Dimensional Extension Two-Phase Flow Dynamics.
DE83048877 117 CP **T15**

FORTIO: FORTRAN Interface to IBM370 MACROS.
DE83048772 95 CP **T11**

SWIFT; Waste-Isolation Flow and Transport Model.
DE83048973 137 CP **T99**

SETS; Set Equation Transformation System.
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NASA; MHD-Modified Chemical Equilibrium Code.
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CONDYN; Polya Model Secondary Electron Spectra.
DE83048786 98 CP **T03**

GSMP; General Systems Analysis Modeling Code.
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DE83048900 122 CP **T12**

GRFPAK; Plot Package for CORTES FEM Programs.
DE83048760 93 CP **T13**

VIVAS2; A-BC Exact Coupled Channel Scattering.
DE83048966 136 CP **T13**

HAFMAT; System Steady-State Flow Distribution.
DE83048616 67 CP **T11**

TIDY-J; FORTRAN Source Code Editing Processor.
DE83048896 121 CP **T11**

GAPCON-THERMAL3; Fuel Steady State and Transient Behavior.
DE83048770 95 CP **T13**

SALE; Analytical Chemistry Quality Control.
DE83048919 126 CP **T13**

RCP01; Monte Carlo Neutron and Photon Transport.
DE83048670 76 CP **T16**

KAPPAS; Semiclassical Transmission Probability.
DE83048945 132 CP **T09**

ODMOD; Soil-Water Trace-Containment Transport.
DE83048789 99 CP **T11**

CATCH; Map Projection Subroutine Package.
DE83048872 116 CP **T11**

REXCO-H (Release 2); Two-Dimensional Hydrodynamic Response to Excursion.
DE83048615 66 CP **T11**

LINSED; One-Dimensional Multireach Sediment Transport Model.
DE83048930 129 CP **T09**

CORTES; Thermal and Mechanical Analysis of Tees.
DE83048759 92 CP **T15**

SCAP; Point Kernel Single or Albedo Scatter.
DE83048933 129 CP **T11**

MARGE/SLUMP; Maximum Temperature LMFBR Fuel Pin.
DE83048677 77 CP **T09**

GETOUT; Radionuclide Transport Geologic Media.
DE83048887 119 CP **T12**

BEACON/MOD3; Containment System Fluid Flow.
DE83048767 94 CP **T99**

QLN1; Quantitative gamma-Ray Spectra Analysis.
DE83048902 123 CP **T13**

ACCEL/MOD2; Design of Printed-Circuit Boards.
DE83048681 78 CP **T18**

XOQDOQ; Nuclear Power Plant Effluent Releases.
DE83048964 136 CP **T11**

AXICRP; Finite Element Code for Creep Analysis.
DE83048785 98 CP **T11**

WHIP1; Structural Deflection Due to Blowdown.
DE83048863 114 CP **T03**

FLOW3; Network Analysis of Three-Dimensional Two-Phase Flow.
DE83048664 75 CP **T15**

DEVOG; Coupled Molecular Scattering Equations.
DE83048920 127 CP **T11**

FRANTIC-NRC; Time-Dependent System Unavailability.
DE83048766 94 CP **T09**

SLIC; Interactive Graphics Three-Dimensional Mesh Generation.
DE83048968 136 CP **T14**

SIEX; LMFBR Fuel Pin Thermal Performance Model.
DE83048673 76 CP **T09**

ICARUS; Redundant System Unavailability Model.
DE83048871 116 CP **T09**

PCTEST; Principal Component Test for Outliers.
DE83048769 95 CP **T09**

SCORE-EVET; Three-Dimensional Hydraulic Reactor Core Analysis.
DE83048931 129 CP **T14**

SITE2; Energy Facility Siting Assessment.
DE83048687 79 CP **T11**

SOFTWARE TOOLS; Program Development Interface.
DE83048967 136 CP **T99**

SULCAL; Model of Sulfur Chemistry in a Plume.
DE83048788 98 CP **T09**

UPD; Source Deck Maintenance Utility Routine.
DE83048864 114 CP **T13**

COMRADEX4; Accident Released Radiological Dose.
DE83048663 74 CP **T09**

PAD; One-Dimensional Coupled SN Neutronics and Hydrodynamics.
DE83048901 122 CP **T16**

CACECO; LMFBR Containment Accident Analysis.
DE83048762 93 CP **T15**

GASPAR; Evaluation of Atmospheric Releases.
DE83048963 135 CP **T11**

HONDO; A Dynamic Response Finite-Element Code.
DE83048672 76 CP **T11**

FX2-TH; Two-Dimensional Time-Dependent Reactor Kinetics.
DE83048862 114 CP **T18**

PRPLOT; Line Printer Plot Subroutine Package.
DE83048773 96 CP **T12**

PC; Coupled Molecular Scattering Equations.
DE83048921 127 CP **T11**

VENTURE; 1, 2, or 3-Dimensional Multigroup Diffusion.
DE83048686 79 CP **T19**

BICYCLE; Levelized Life Cycle Cost Calculation.
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SLGTR; Slag Transport Models for Duct Surfaces.
DE83048783 97 CP **T03**

INTEROP; Nonlinear Optimization Algorithms.
DE83048866 115 CP **T12**

FTA; Fault Tree Analysis System.
DE83048666 75 CP **T11**

TDELAY; Scattering Phase Shifts and Time Delays.
DE83048928 128 CP **T09**

PTA1; Pipe System Pressure Analysis.
DE83048761 93 CP **T11**

RATEPAC; Power Plant Revenue Requirements Code.
DE83048969 137 CP **T11**

DEMO4; CRBR Reactor and Plant Transient Analysis.
DE83048676 77 CP **T13**

PAMA; Preferred Acquisition Method Analysis.
DE83048867 115 CP **T11**

IMPORTANCE; FTA Basic Event and Cut Set Ranking.
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OCTAVIA; Pressure Vessel Failure Probabilities.
DE83048898 122 CP **T09**

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NALAP; LMFBR Transient Response to Accident.
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ARRRG;FOOD; Aquatic and Terrestrial Radiation.
DE83048925 127 CP **T12**

OMCOST; Power Plant Non-Fuel Operation and Maintenance Cost Study.
DE83048688 79 CP **T09**

DAP; Deuterium Depth Profile in Uniform Solids.
DE83048970 137 CP **T09**

HEMP; Hydrodynamic Elasticmagneto Plastic Flow.
DE83048775 96 CP **T14**

FESH; X-Y Multi-Group Neutron Transport Method.
DE83048861 114 CP **T11**

BUCKLE; Creep Buckling of Initially Oval Tube.
DE83048667 75 CP **T03**

PL-MOD; Fault Tree Analysis by Modularization.
DE83048897 122 CP **T11**

PROSA2; Probabilistic Response Surface Studies.
DE83048778 97 CP **T18**

UT200; DEC Emulation of CDC 200 User Terminal.
DE83048916 126 CP **T03**

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